

Review of lady beetles in the *Cycloneda germainii* species complex (Coleoptera; Coccinellidae: Coccinellinae: Coccinellini) with descriptions of new and unusual species from Chile and surrounding countries

GUILLERMO GONZÁLEZ¹ & NATALIA J. VANDENBERG²

¹Santiago, Chile, Nosedal 6455 La Reina. E-mail: willogonzalez@yahoo.com

²Systematic Entomology Lab, Plant Sciences Institute, Agriculture Research Service, USDA, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, MRC-168, Washington, DC.
E-mail: nvandenb@sel.barc.usda.gov

Table of contents

| | |
|--|----|
| Abstract | 13 |
| Introduction | 14 |
| Historical review | 15 |
| Material and methods | 15 |
| Key to species in the <i>Cycloneda germainii</i> species complex | 18 |
| Systematics | 20 |
| <i>Cycloneda lacrimosa</i> González & Vandenberg, new species | 20 |
| <i>Cycloneda disconsolata</i> Vandenberg & González, new species | 23 |
| <i>Cycloneda patagonica</i> González & Vandenberg, new species | 25 |
| <i>Cycloneda germainii</i> (Crotch) new combination | 32 |
| <i>Cycloneda eryngii</i> (Mulsant) new combination | 36 |
| <i>Cycloneda sicardi</i> (Brèthes) new combination | 42 |
| <i>Cycloneda boliviana</i> (Mulsant) new combination, status revised | 46 |
| Acknowledgments | 48 |
| Literature cited | 49 |

Abstract

A complex of lady beetle species including *Cycloneda germainii* (Crotch) is reviewed and seven valid species recognized, including *C. germainii*, *C. eryngii* (Mulsant), *C. sicardi* (Brèthes), *C. boliviana* (Mulsant), and three new species, *C. lacrimosa* González & Vandenberg, **n. sp.**, *C. disconsolata* Vandenberg & González, **n. sp.**, and *C. patagonica* González & Vandenberg, **n. sp.**

Cycloneda duplaris (Berg) and *Arrowella albilacus* Brèthes, previously synonymized with *C. areata* Mulsant, are placed as new synonyms of *C. germainii*; *C. boliviana* is removed from synonymy with *C. areata* and reinstated as a full species; *C. sicardi* (Brèthes) is recognized as the valid replacement name for *C. areata* Mulsant. All seven species in the *C. germainii* species complex are diagnosed, described, and illustrated. Geographical distributions, prey associations (when known), and a key to species are provided. The occurrence of Coccinellini species with reduced (10 or 9) or variable numbers of antennomeres is noted for the first time, as well as loss of gender-specific color pattern polymorphism in some of the species studied.

Key words: Insecta, Coleoptera, Coccinellidae, *Cycloneda*, *germainii*, complex, new species, key, Neotropical, Patagonia, Chile, austral, aphidophagous

Introduction

Color pattern polymorphism occurs in many coccinelline lady beetles, posing a challenge to those who wish to identify or characterize the species. Conversely, the tendency for related species to have similar markings sometimes has led to confusion or misidentification. Modern taxonomists find that the male genitalia often provide a definitive means for separating cryptic species and properly associating members of a polymorphic species, but this method is less useful if the key structures are simplistic or evolutionary changes have been conservative. The group of species treated in the present paper exemplifies many of the difficulties encountered in studies of lady beetle taxonomy. While we hope to have resolved some of the preexisting problems in the *Cycloneda germainii* species complex, we recognize that this study also has raised additional taxonomic questions that will require further study and possibly the application of molecular and other alternative approaches.

The present collaboration arose from the need to identify certain lady beetle species for inclusion in a forthcoming book on the lady beetles of Chile by Guillermo González. Names are provided for three new species of *Cycloneda* occurring in Chile and adjacent countries, including a very dark and exceptionally gracile species from the “Ends of the Earth” (Patagonia, Tierra del Fuego). Of additional interest, we document for the first time the occurrence of Coccinellini species having a reduction in the number of antennomeres from the standard 11, and describe a particularly unusual new species that is apparently polymorphic with respect to that character. The distributions, color pattern variations, external morphology, and genitalia of seven closely related species of *Cycloneda* are described and illustrated. We informally refer to this group as the *germainii* species complex because the various constituents have frequently been confused in the literature and museum collections with their better known member *C. germainii*, described by Mulsant in 1850.

Cycloneda Crotch is a New World genus in the tribe Coccinellini. The genus was proposed as a replacement name for *Daulis* Mulsant (1850), preoccupied by *Daulis* Erichson (1842). The group was initially composed of an eclectic assemblage of 32 rounded convex coccinellid beetles from around the world, defined by the possession of an incomplete postmetacoxal line and basally toothed tarsal claw. In an attempt to create a more natural classification, Timberlake (1943) confined the genus to members of the New World coccinelline fauna, but continued to define its composition based on the aforementioned characters and general body form. Vandenberg (2002) reviewed the genus and further restricted membership to species with certain common genitalic traits, while simultaneously including species of more divergent body types (e.g., the more elongated forms previously in *Coccinellina* Timberlake). The latter concept of *Cycloneda* is perpetuated here, but based on recent observations of the *Cycloneda germainii* species complex, the diagnosis should be corrected to include species with little or no sexual dimorphism in the coloration of the head capsule.

Cycloneda occurs in North, Central, and South America, as well as the Caribbean. The fauna appears to be most diverse in South America, particularly in montane, temperate and austral regions. Unfortunately, only the North American fauna has been studied in any detail, and museum collections house an abundance of undescribed material belonging to the group, much of it represented by few or unique exemplars. *Cycloneda* species appear to feed primarily on aphids, though occasionally on other soft-bodied insects and mites. Gordon (1985) lists aphid prey for the three North American species, and reports by Bosq (1952) and Aguilera (1995) corroborate the aphidophagous tendency for members of the *C. germainii* species complex.

The probable sister group and broader relationships of *Cycloneda* are discussed in Vandenberg (1992) and Vandenberg and Gordon (1988, 1996). Vandenberg (2002) should be consulted for the generic synonymy, known species composition, and a more complete historical review.

Material and methods

The following institutional and private collections were consulted during this study (acronyms assigned here are used throughout the paper):

| | |
|------|--|
| AAPC | Alfonso Aguilera Private Collection, Temuco, Chile |
| AMNH | American Museum of Natural History, New York City, New York, USA |
| BMNH | The Natural History Museum, London, England |
| CASC | California Academy of Sciences, San Francisco, California, USA |
| GGPC | Guillermo González Private Collection, Santiago, Chile |

| | |
|-------|---|
| IML | Fundacion e Instituto Miguel Lillo, Tucuman, Argentina |
| INIA | Instituto de Investigaciones Agropecuarias, Chile |
| MHNL | Musee D'Histoire Naturelle de Lyon, France |
| MNHN | Museo Nacional de Historia Natural, Santiago, Chile |
| MNHP | Museum National d'Histoire Naturelle, Paris, France |
| MNHUB | Museum fur Naturkunde der Humboldt-Universitat, Berlin |
| MBR | Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Buenos Aires, Argentina |
| UCCC | University Museum Cambridge University, Crotch Collection, Cambridge, England |
| USNM | National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA |

The techniques employed by the two authors in the present study are similar in their essential details. Specimens were softened either by placing them between damp papers or soaking in warm water with a drop of hand dish soap to break the surface tension. Aqueous potassium hydroxide was used to dissolve excess tissue and partially clear more opaque structures. Dissections were performed with the aid of a stereomicroscope and standard dissecting tools (forceps, scalpel, needle, etc). Temporary mounts were prepared in glycerin for microscopic examination, and specimen proportions were obtained using a camera lucida or web cam. Measurements, expressed in millimeters, were made using a hand-held micrometer as follows: length, along midline from anterior-most point of head capsule to elytral or abdominal apex; width, across both elytra at widest part. Eye separation was calculated as the minimum distance between the eyes in a frontal view, expressed in terms of eye diameter. The density of punctures on dorsal surfaces was quantified by comparing the separation between punctures to the average apparent diameter of a puncture when viewed with oblique lighting.

Elytral color patterns were drawn from a rotated (dorsolateral) view, with line-of-sight at right angles to the middle of the disc in order to minimize distortion. Final drawings were created with the aid of a computer and various digital painting and drawing software. Illustrations were produced by the authors or by other persons as noted in the acknowledgments. Terminology used in the descriptions of genitalic characters follows Vandenberg (2002). Although both male and female genitalia have been illustrated in this work, caution is advised in interpreting differences in the female genitalia. Slight variations in the orientation or focal plane of complex structures, such as the hemisternites (morphological ninth abdominal sternites) and spermatheca, can produce large differences in appearance; also, apparent variations in the flexible membranous portions of the female tract may be largely circumstantial. These concerns exist to a lesser degree with the male genitalia. The structures illustrated are predominantly sclerotized, and both the siphon (aedeagus) and proximal portion of the basal lobe are largely planar. Also, a lateral view

of the phallobase is provided to assist in visualizing the apical curvature of the basal lobe, as well as the relationships between the basal lobe and parameres.

Label data for the specimens examined are summarized in order to present a uniform format and assist in distribution plotting. The format used is as follows: **COUNTRY OF ORIGIN**: **REGION**: additional details if known, date in a standardized format with day followed by month in roman numerals and year (collector), number of specimens with the given data. Labels from the type material are cited *verbatim* with corrections or any supplemental interpretation added in square brackets. Depositories are indicated in parentheses at the end of the data summary for each species or following the verbatim data for each type specimen.

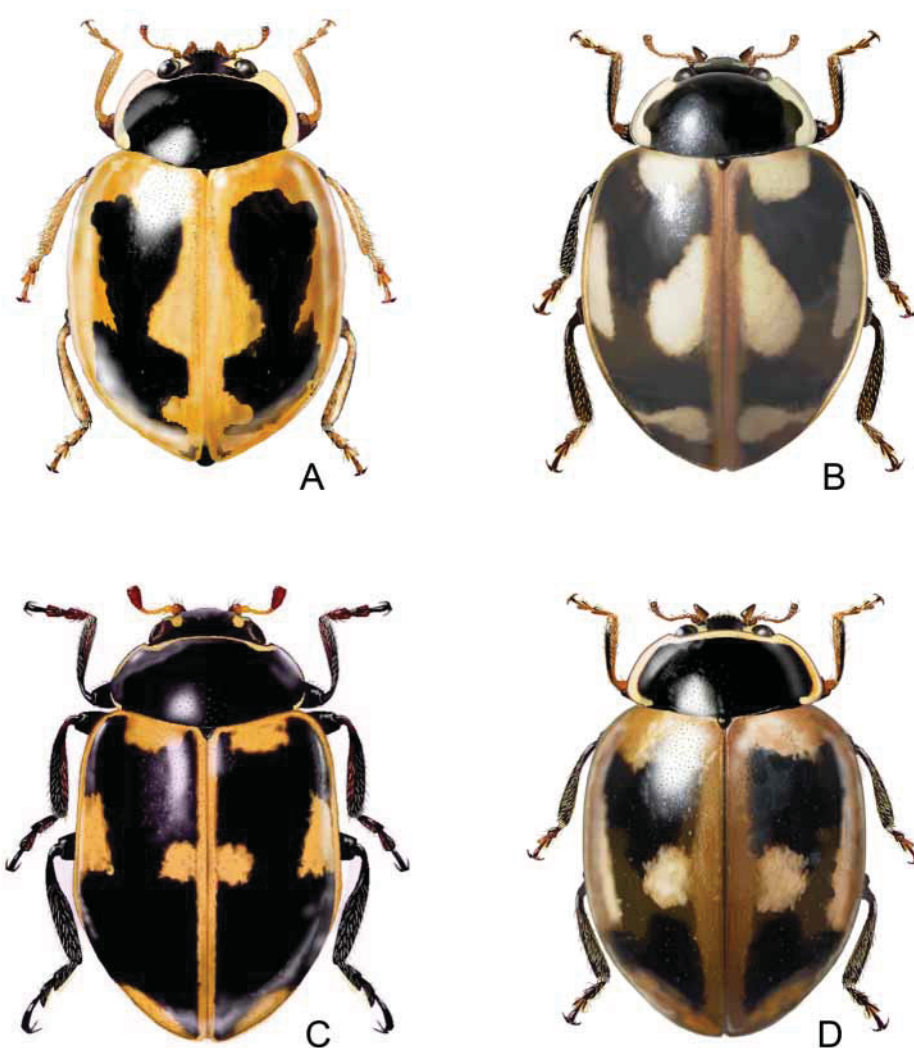


FIGURE 1. Habitus views of *Cycloneda* species: A, *C. lacrimosa* González & Vandenberg, new species, male, paratype (3.0 mm); B, *C. disconsolata* Vandenberg & González, new species, female, holotype (3.3 mm); C, *C. patagonica* González & Vandenberg, new species, paratype (3.0 mm); D, *C. germainii* (Crotch), female, common form (3.5 mm).



FIGURE 2. Habitus views of *Cycloneda* species: A, *C. eryngii* (Mulsant), female, common form (3.8 mm); B, *C. sicardi* (Brèthes), female from Salta, Argentina (3.8 mm); C, *C. boliviana* (Mulsant), female, holotype (4.6 mm).

Key to species in the *Cycloneda germainii* species complex

1. Form somewhat depressed, elongate elliptical; elytral epipleuron flat, ascending externally, visible in lateral view (Fig. 3C); elytron narrow, parallel-sided for much of length (Figs. 5A–D); punctuation on pronotum and elytron dense (separated by 1.0–2.5X a diameter), sharply defined; antenna short, composed of 10 antennomeres, strongly, abruptly clubbed (Fig. 9D). Recorded from Magellanes, Chile and Tierra del Fuego, Argentina (Fig. 10, triangles).....
.....*C. patagonica* González and Vandenberg

- 1'. Form moderately to strongly convex, ovoid to oblong; elytral epipleuron flat to concave, approximately horizontal, not visible in lateral view or only very narrowly so in anterior half (Figs. 3A, B, D–G); elytron broader, with external (lateral) border more arcuate (Figs. 4A–P, 5E–K); punctation less dense, variable, sometimes indistinct; antenna longer (Figs. 9A–C, E–H), of 9–11 antennomeres, club variable. Bolivia, Chile, Argentina; not known from southeast of the straits of Magellan..... 2
- 2 (1'). Pronotum with white to cream-colored anterior and lateral borders uneven (Figs. 3H, J–K); lateral border distinctly wider than anterior border; anterior border sometimes broken or obsolete, in some specimens with spurlike markings projecting posteriorly onto disk (Fig. 3L). 3
- 2'. Pronotum with white to cream-colored border of uniform width (Fig. 3I), or at most only slightly narrower anteriorly than laterally, without spurlike markings 5
- 3 (2). Elytra with dark maculae framing a common pale teardrop-shaped mark or pair of such marks near suture at midlength (Figs. 1A, B); body form shortened, oblong, strongly convex (Figs. 3A, B); antenna with 9, 10, or 11 antennomeres 4
- 3'. Elytra with pair of discrete pale circular marks near suture at midlength (Fig. 2B); body form slightly elongate oval, moderately convex (Figs. 2B, 3F); antenna with 11 antennomeres (Fig. 9G). Bolivia, Argentina (Fig. 11, stars)... *C. sicardi* (Brèthes)
- 4 (3). Elytra bicolored, or at least with orange to paler cream areas strongly suffused; common teardrop-shaped mark not divided at suture; dark maculae as shown (Figs. 1A, 4M–N). Northern Chile, northern Argentina, Bolivia (Fig. 10, squares)..... *C. lacrimosa* González and Vandenberg
- 4'. Elytra distinctly tricolored: pale central elytral figure divided by ferrugineous suture to form pair of cream-colored teardrop-shaped marks, one on each elytron; dark maculae as shown (Figs. 1B, 4O–P). Known from disjunct localities in Chile, Argentina (Fig. 10, circles with cross)... *C. disconsolata* Vandenberg and González
- 5 (2'). Posterior third of each elytron with pale spot positioned near apex (Figs. 4I–L) and often obliquely flattened against posterolateral margin (pale spot poorly distinguished from orangy ground color in most *C. eryngii*, Figs. 4A–H). Dorsal surfaces shiny; punctation sharply defined; surface between punctures with less apparent reticulation. Widespread in Chile and Argentina 6
- 5'. Posterior third of each elytron with circular to irregular pale spot centered some distance from apex (Figs. 5I–K), but with outer edge approaching apex if spot is large (Fig. 5I). Dorsal surfaces matt; punctation shallow and indistinct; surface between punctures with pronounced reticulation (alutaceous). Known from Bolivia and northern Argentina (Fig. 11, circles with dot) *C. boliviana* (Mulsant)
- 6 (5). Antenna with 11 antennomeres (Fig. 9F). Most specimens with dark elytral marks well separated at midline, less commonly with marks touching or longitudinally connected midway between sutural and median area of each elytron (Figs. 4A–H); elytron in lateral view evenly convex and tapering toward apex, broader at anterior

- 1/4 than at posterior 1/4 (Fig. 3E); in dorsal view, outer margin of elytron distinctly arcuate (Figs. 2A, 4A–H). Male genitalia with basal lobe slender, broadest at base *C. eryngii* (Mulsant)
- 6'. Antenna with 10 antennomeres (Fig 9E). Most specimens with dark elytral marks connected by median longitudinal stripe (Figs. 4J–K), some also with narrow para-sutural and/or paralateral longitudinal connections, less commonly with median connection obsolete (Fig. 4I, L) or indicated only in ground color; elytron in lateral view less convex in anterior half, less strongly tapered, equally broad at anterior and posterior 1/4 (Fig. 3D); in dorsal view, outer margin of elytron linear to weakly arcuate for much of length (Figs. 1D, 4I–L). Male genitalia with basal lobe more robust than in preceding species, broadest at swollen region in apical 1/2 *C. germainii* (Crotch)

Systematics

Cycloneda lacrimosa González & Vandenberg, new species

(Figs. 1A; 3A, H; 4M–N; 6A; 8A; 9A–C; 10)

Diagnosis: Distinguished from other *Cycloneda* species by the bicolored or very weakly tricolored elytra with a large ocher-colored teardrop-shaped sutural macula, and by the robust convex oblong body form (Figs. 1A, 3A). This species appears to be closely related to *C. disconsolata*, new species, but the latter has the elytron distinctly tricolored and the dark discal figure extended obliquely toward the humeral angle. If females of the two species are compared, *C. lacrimosa* is distinctly broader. *Cycloneda lacrimosa* is similar in color and convexity to *C. eryngii* (Mulsant), but the latter has an ovoid body form, with the lateral elytral margin more evenly arcuate (Fig 2A), and the elytron bearing a pair of transverse discal maculae that are separated at the midline, or joined only at the inner edges (Figs. 4A–H). The male genitalia of *C. lacrimosa* (Fig. 6A) have the basal lobe more strongly dilated in apical 1/4 compared with the other species in this complex (except males not known in *C. disconsolata*).

Description (Holotype male): Length 3.0 mm, width 2.3 mm. Form shortened oblong, nearly parallel-sided, convex, apically rounded; elytral, pronotal margins very narrowly reflexed. Punctuation on dorsal surfaces fine, regular, with each puncture separated by 2.0–3.0X its diameter; surface between punctures shiny, reticulate on head, pronotum, with only faint trace of reticulation visible on elytron.

Dorsal color pattern as follows: Head black with two irregular cream-colored spots, one at inner margin of each eye extending from eye canthus to just below level of upper 1/3 of eye; eye silvery; labrum brown. Pronotum predominantly dark reddish brown, nearly black; lateral margins yellow cream-colored, beginning at posterior angle as narrow band, widened apically to enclose entire anterior angle, continued as broken trace on

anterior margin (Fig. 3H). Scutellum black. Elytron with ground color pale ochreous or straw with dark brown irregular figure filling most of disc (Fig. 4N); discal figure with incised borders as follows: outer border with anteromedial triangular emargination pointing toward sutural apex; inner border with large teardrop-shaped emargination followed by smaller semicircular emargination, the latter deeply penetrating the dark zone leaving only a slender dark hook; union of dark, light areas irregular, suffused, somewhat reddish. Each puncture of dorsal surfaces with pinpoint of brown at center, visible only in areas with light to medium background coloration; staggered double row of punctures nearest suture, single to double staggered row along lateral margin beginning just outside of humeral bulge with more pronounced pigmentation. Anterior, lateral margins of pronotum, all margins of elytron narrowly transparent to light amber, sutural margin somewhat darker.

Ground color of ventral surfaces dark brown; elytral epipleuron, pronotal hypomeron except basally at inner margin straw-colored; mesepimeron cream-colored; antenna, mouthparts yellow brown with antennal club slightly darker; legs with coxa brown, femur dark brown to blackish; tibia yellow brown with darker brown narrowly along outer margin; tarsus translucent yellow brown with last tarsomere, base of claw darker. Ventral surfaces including appendages clothed in decumbent silvery pubescence.

Eyes finely faceted, separated by $2\frac{1}{2}X$ eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 10 antennomeres (Fig. 9B), combined length slightly greater than distance between eyes; third antennomere elongate, $1\frac{1}{2}X$ length of second, subequal to four plus five combined. Pronotum (Fig. 3H) evenly convex except for very narrowly reflexed transparent lateral margin; in outline with basal margin subsinuate, lateral margin strongly evenly arcuate, anterior margin subtrapezoidally emarginate, medially slightly arcuately produced; anterior angles subtriangulate, conspicuous in dorsal view, projecting anteroventrally. Elytron broad (Figs. 4M–N), in dorsal view with humeral angle rounded, weakly arcuate from beyond humeral angle to apical $\frac{1}{3}$, broadest near apical $\frac{1}{3}$, roundly tapered distally; epipleuron flat, horizontal in anterior half, progressively inwardly sloping in posterior half. Prosternum T-shaped, with lateral arms gently folded back from stem, in cross section forming shallow arc; intercoxal process weakly convex, bearing fine superficial median sulcus on distal $\frac{1}{4}$, apex truncate. Mesosternum trapezoidal; anterior border approximately linear with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; surface polished, obsoletely rugulose; discrimen present, indistinct. Abdomen shortened semi-oval, broadest between first, second ventrites; posterior margin of ventrites 1–4 linear, of 5 broadly shallowly emarginate, of 6 apically rounded; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with shallow subquadrate basal tooth.

Male genitalia as shown (Fig. 6A): basal lobe elongate, roughly parallel-sided in basal half, subapically distinctly swollen with greatest width at apical $\frac{1}{4}$; apex tapered, slightly

attenuate; parameres slender, reaching three quarters distance to apex of basal lobe.

Female: Similar to male except slightly larger on average and proportionally broader, apex slightly pointed. Abdomen with posterior margin of ventrite 5 nearly linear, apex of ventrite 6 pointed. Female genitalia as in figure 8A.

Variation: Length 3.0 to 3.6 mm. Pale markings on head variable in size but always well separated by dark frons; not gender-specific. Pale anterior margin of pronotum obsolete to narrow but entire. Elytron may have additional dark spot at apex (Fig. 1A), or faint dark spot at humeral bulge; sometimes with hook shaped mark at apex of dark discal figure disconnected (Fig. 4M) or entirely absent; some specimens with suffused cream-colored maculae nested within 3 incised areas of dark discal figure; more commonly with ground color only slightly lighter on disc or apparently unicolorous. Dark areas on dorsal surfaces nearly black in many specimens. Pronotal hypomeron unicolorous or basally darkened as in holotype. Tibia totally yellowish in some. Antenna may have 9, 10 or 11 antennomeres (Figs. 9A–C). Sulcus on prosternal intercoxal process may be less distinct or wavering.

Type material: Holotype (male) “Agua Verde, Antofagasta, Chile, 25-dic-1986. G. González F.”(MNHN); Allotype (female), “CHILE, Antofagasta, Agua Verde. 21-diciembre-1991, leg. G. Gonzalez.” (MNHN); Paratypes (total=24), 1 with same data as holotype (MNHN), 18 with same data as allotype (4, AMNH; 3, CAS; 7, MNHN; 4, USNM), 4 “Oruro, Bolivia, 14.1.40 3700 m, W. Wittmer/Brit.Mus., 1945-33.[one paratype mounted along with an incomplete specimen, the latter not designated as a paratype] (BMNH), 1 “ARGENTINA, SALTA, Nevado de Cachi, 5200 m_6m, 6.I-1973, Col: Stephan Halloy/COLECCION, INST.– FUND M. LILLO (4000) – S.M.TUCUMAN, TUCUMAN – ARGENTINA”(IML)

Etymology: From the Latin *lacrimosus* (adj.) meaning “prone to tears or crying,” the name is a reference to the large teardrop-shaped mark at the elytral suture.

Remarks: The specimens from Agua Verde were collected at an isolated gas station in the Atacama Desert, on plants in flower-pots, about 800 kilometers north of the northern most locality for *C. germainii*. From this single collection locality specimens were obtained with either nine, ten, or eleven antennomeres. These variants are assumed to be conspecific as they show no other apparent differences. Figure 9A–C suggests one possible interpretation for the observed variation based on fusion in the region between the basal two and distal six antennomeres. This hypothesis is supported by a corresponding increase in the length of antennomere four in specimens with only ten antennomeres, or antennomere three in specimens with only nine antennomeres. Antennal polymorphism was previously reported in the coccinellid species *Catana clauseni* Chapin (Serangiini). Chapin (1940) distinguished *Catana* Chapin from other members of the tribe by the possession of only eight antennomeres, but he noted that the fifth antennomere sometimes shows the beginning of a division and is therefore morphologically equivalent to the fourth and fifth combined. Miyatake (1961) subsequently discovered a specimen of *C. clauseni*

with a complete division resulting in nine distinct antennomeres as in the related genus *Serangium*.

It is probable that Weise was familiar with the new species described here, but regarded it as a variation of *C. eryngii*. The Smithsonian Entomology Library has a copy of Crotch (1874) that was signed by Weise and apparently extensively annotated by him. In the left hand margin of page 107, below the caption for *Coccinella eryngii*, is a hand-penned figure (left half of pronotum, left elytron) of a specimen with a pattern identical to the example illustrated in figure 4N. The sketch is labeled with the female symbol and the words “var. Moreno, Argentin. Mus. [illegible word]”.

Data from specimens examined (Map, Fig. 10): see “Type material,” above.

***Cycloneda disconsolata* Vandenberg & González, new species**

(Figs. 1B; 3B; 4O–P; 8B; 10)

Diagnosis: Distinguished from other *Cycloneda* species by tricolored elytra with a pair of cream-colored teardrop-shaped marks, one on each side of the suture (Fig. 1B), convex oblong body form (Fig. 3B), and antenna composed of 10 antennomeres. This species appears to be closely related to *C. lacrimosa*, but, unlike the preceding species, the suture is ferrugineous and distinctly darker than the pale elytral maculae (Figs. 4O–P). *Cycloneda disconsolata* can be distinguished from all other species except *C. lacrimosa* by the teardrop-shaped mark near the elytral suture.

Description (Holotype female): Length 3.3 mm, width 2.3 mm. Form shortened oblong, nearly parallel-sided, convex, apically pointed; elytral, pronotal margins very narrowly reflexed. Punctuation on dorsal surfaces fine, regular, with each puncture separated by 2.0–3.0X its diameter; surface between punctures shiny, reticulate on head, pronotum, with only faint trace of reticulation visible on elytron.

Dorsal color pattern as follows: Head black with two irregular cream-colored spots, one at inner margin of each eye extending from eye canthus to just below level of upper 1/3 of eye; eye dark with hint of silvery reflections; labrum dark brown. Pronotum predominantly black; lateral margins narrowly cream-colored, widened apically to enclose entire anterior angle, terminating opposite inner orbit of eye, faintly suggested beyond by cream-colored stippling. Scutellum black. Elytron with deeply incised irregular black figure against cream-colored background as shown (Fig. 1B, 4P); figure offset from lateral margin by cream-colored band about equal to scutellar width, offset from sutural margin by equally broad ferrugineous band; black figure with incised borders as follows: base with semicircular emargination; outer border with anteromedial trapezoidal emargination, apical 1/4 with deep spatulate incision beginning at outer border, nearly attaining ferrugineous sutural band; inner border with large teardrop-shaped emargination near midline; union of dark, light areas irregular, narrowly ferrugineous, strongly suffused at elytral apex, humeral angle. Each puncture of dorsal surfaces with pinpoint of brown at

center, visible only in areas with light to medium background coloration; staggered double row of punctures nearest suture with more pronounced pigmentation; scattering of similar punctures visible on margins of cream-colored maculae near suture. Anterior, lateral margins of pronotum, all margins of elytron narrowly transparent, pale amber on outer elytral margins, dark reddish amber on sutural margin.

Ground color of ventral surfaces dark reddish brown, nearly black; elytral epipleuron, pronotal hypomeron except basal dark spot at inner margin cream-colored; mesepimeron cream-colored; antenna, mouthparts amber brown with first, last two antennomeres dark brown; legs nearly black with all tarsi, protibia, apex of meso-, metatibia slightly lighter. Ventral surfaces including appendages clothed in decumbent silvery white pubescence.

Eyes finely faceted separated by $2\frac{1}{2}X$ eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 10 antennomeres, combined length slightly greater than distance between eyes; third antennomere elongate, $1\frac{1}{2}X$ length of second, subequal to four plus five combined. Pronotum evenly convex except for very narrowly reflexed transparent lateral margin; in outline with basal margin subsinuate, lateral margin strongly evenly arcuate, anterior margin subtrapezoidally emarginate, medially slightly arcuately produced; anterior angles subtriangulate, in dorsal view obscured by curvature of pronotum with only extreme apex visible, projecting ventrally, slightly anteriorly. Elytron broad (Figs. 4O–P), in dorsal view with humeral angle rounded, weakly arcuate from beyond humeral angle to apical two-fifths, broadest just beyond middle, almost linearly tapered distally, rounded at extreme apex; epipleuron weakly concave, horizontal in anterior half, progressively inwardly sloping in posterior half. Prosternum T-shaped, with lateral arms gently folded back from stem, in cross section forming shallow arc; intercoxal process weakly convex, shallowly triangularly impressed along midline in distal $\frac{1}{4}$ th. Mesosternum trapezoidal; anterior border approximately linear, with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; surface polished with faint transverse rugulae, more apparent near midline; discrimen present, indistinct. Abdomen shortened semi-oval, broadest between first, second ventrites; posterior margin of ventrites 1–4 linear, of 5 weakly arcuate; exposed portion of 6 subtriangular; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with shallow subquadrate basal tooth. Genitalia as in figure 8B.

Male: Unknown.

Variation: Length 2.9 to 3.3 mm. Pale anterior margin of pronotum obsolete to narrow but entire; one specimen with pair of linear cream-colored marks enclosed within dark pronotal disc, situated one on each side at anterior $\frac{1}{3}$, equidistant from lateral margin and midline. Elytron with pale marks as in holotype or with cream-colored markings more extensive, with anterior mark joined to teardrop-shaped mark as shown (Fig. 4O). Dark coloration on pronotum, elytron varies from blackish to dark reddish brown. Venter blackish to medium brown. Tarsi dark brown to light yellow brown or

amber; pro-, mesotibia, apex of metatibia yellow brown in one specimen.

Type material: Holotype (female), “37 [round label]/Lupica, Parinacota, [Tarapaca,] Chile, 3 2000 m.s.n.m., Mayo 20, 1982/En paja brava, D. Bobadilla coll./Coccinellina eryngii? (Mulsant) det. R.Gordon 87” (INIA); Paratypes (total=2 females), 1 “Valcheta, [Rio Negro,] Arg./No. 392, So Amer, Montevideo, Paras Lab, Date 1-20-43 Host” (USNM), 1 “RIO SECO, Cord: Arica, 18-Nov-1952, Coll:L.E.Pena” (USNM).

Etymology: From the Latin *disconsolatus* (L. *dis-* + *consolatus*, p. p. of *consolari* to console), meaning “incapable of being consoled, filled with grief, hopelessly sad,” the name is a reference to the pair of teardrop-shaped marks, one on each side of the elytral suture.

Remarks: The antenna of this species appears to have a similar shape and proportions to examples of *C. lacrimosa* with 10 antennomeres (Fig. 9B). The antenna of *C. disconsolata* was not dissected and slide mounted due to the paucity of material available, and the desire to keep the type specimens intact.

Data from specimens examined (Map, Fig. 10): see “Type material,” above.

***Cycloneda patagonica* González & Vandenberg, new species**

(Figs. 1C; 3C; 5A–D; 6B; 8C; 9D; 10)

Diagnosis: Distinguished from other *Cycloneda* species by the elliptical, somewhat depressed body form (Figs. 1C, 3C), narrow parallel-sided elytron with close deep punctation (separated by 1.0–2.5 diameters) (Figs 5A–D), epipleuron easily visible in lateral view (Fig 3C), and short antenna, composed of 10 antennomeres with an abrupt club (Fig. 9D). This species appears to be most closely related to *C. germainii*, and is most likely to be confused with the “*duplaris*” form (Fig. 4K), which has very similar elytral maculation. It differs from the latter in the characters given above, and in the male genitalia, particularly the shape of the basal lobe which is shorter and apically less attenuate and more obtusely rounded.

Description (Holotype male): Length 2.9 mm, width 1.7 mm. Form elliptical, parallel-sided, somewhat depressed (Fig. 3C), apically rounded; elytral, pronotal margins very narrowly reflexed. Punctation on dorsal surfaces deep, close, with each puncture separated by 1.0–2.5 X its diameter; surface between punctures shiny, strongly reticulate on head, pronotum, moderately reticulate on elytron.

Dorsal color pattern as follows: Head black with two cream-colored spots, one at inner margin of each eye extending from eye canthus to just beyond level of upper 1/2 of eye; eye dark with hint of silvery reflections; labrum dark brown. Pronotum predominantly black; anterior, lateral margins with narrow variable cream-colored border, about 1/20 width of pronotum, narrower in anterior margin; anterior border medially infusate; lateral border infusate to interrupted on each side near basal 1/3, coincident with region of maximum pronotal width. Elytron predominantly black, with ocher-colored

circumferential band, four maculae as shown (Fig. 1C), all but basal macula slightly lighter than band; band narrow, even, entire, about 1/10 elytral width, apex fuscus. Elytral maculae arising from, broadly confluent with band, disposed as follows: irregular semicircular basal macula occupying median 2/5 of base, penetrating to basal 1/10; oblique irregular quadrangular macula near outer margin at middle of length; subapical irregular semicircular macula positioned in posterolateral 1/4; smaller parasutural circular macula just behind mid elytral length; union of dark, light areas somewhat irregular, suffused, reddish to ferruginous. Each puncture of dorsal surfaces with pinpoint of brown at center, visible only in areas with light to medium background coloration; single to double staggered row of punctures at inner margin of sutural band, single to double staggered row along lateral margin beginning just outside of humeral bulge with more pronounced pigmentation. Anterior, lateral margins of pronotum narrowly yellowish amber, gradually darkening to onyx in posterior half of lateral margin; all margins of elytron narrowly amber, darker near apex of lateral margin, sutural margin more reddish amber.

Ground color of ventral surfaces black; elytral epipleuron, triangular anterolateral half of pronotal hypomeron ocher; mesepimeron cream-colored; mouthparts amber brown; antenna with basal 2 antennomeres brown, remainder missing from specimen (see variation section below); leg black, with coxa dark reddish brown, tarsus brown. Ventral surfaces including appendages clothed in decumbent greyish white pubescence; hairs fine, long.

Eyes finely faceted, separated by slightly more than 2X eye diameter; inner orbits diverging toward top of head. Antenna broken (see variation below). Pronotum evenly convex except for very narrowly transparent lateral margin; margin distinctly reflexed in anterior half, not or weakly so in posterior half. Pronotum in outline with basal margin strongly arcuate in median half, flatter externally; lateral margin arcuate; anterior margin weakly emarginate, medially arcuately produced nearly as far as anterior angles; anterior angles subtriangulate, in dorsal view obscured by curvature of pronotum. Elytron narrow (Figs. 5A–D), in dorsal view with humeral angle abruptly rounded, nearly linear from beyond humeral angle to apical two-fifths, arcuately tapered distally, rounded at extreme apex; epipleuron flat, ascending externally, visible in lateral view (Fig. 3C). Prosternum T-shaped, with lateral arms strongly folded back from stem, in cross section abruptly raised at middle, not forming a simple arc; intercoxal process strongly convex with fine superficial median sulcus along most of length. Mesosternum elongate trapezoidal; anterior border approximately linear, with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; surface transversely rugulose, discrimen shallow, somewhat obscured by rugulae. Abdomen elongate semi-oval, broadest in apical half of first ventrite; posterior margin of ventrites 1–4 linear, of 5 weakly arcuate; exposed portion of 6 spindle-shaped; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with shallow subquadrate basal tooth.

Male genitalia as shown (Fig. 6B): basal lobe elongate, lateral margin weakly sinuate, roughly parallel-sided in basal two thirds, subapically slightly swollen with greatest width at apical one third; apex tapered, slightly attenuate; parameres slender, reaching three quarters distance to apex of basal lobe.

Female: Similar to male except larger on average. Abdomen with posterior margin of ventrite 5 nearly linear, apex of ventrite 6 rounded. Female genitalia as in figure 8C.

Variation: Length 2.8 mm to 4.0 mm. Antenna very short (Fig. 9D), length equal to distance between eyes, composed of 10 antennomeres; with third antennomere short, subequal to fourth; strongly clubbed. Some specimens with pale anterior, lateral margins of pronotum narrow but entire, forming an even band, or with portions of either or both infusate, broken or obsolete. Elytral spots larger or smaller than in holotype (Figs. 5A–D); in some specimens one or more of 3 posterior spots entirely surrounded by black; anterior spot same color as suture, paler cream as in remaining elytral spots, or of an intermediate color; ocher-colored circumferential band may be reddish at apex or absent. Legs may be entirely blackish; pronotal hypomeron with more or less extensive pale area; elytral epipleuron unicolorous or with apical 1/5 blackened.

Type material: Holotype (male) “Chile, I. Navarino, Pto. Williams, 1.2.57/ Coll. Kuschel” (MNHN); Allotype (female) “Magellanes, Canal Beagle, Isla Navarino/Pto. Williams, Feb.1.1957, T.Cekalovic/ChpnSlide 58-369 [female genitalia and abdomen on separate slide mount]”(USNM); Paratypes (total=10), 1 same data as Holotype but missing collector label, and with additional label “Coccinella germaini Crotch,” and 1 “Pto Williams, 1 feb 1962, Cekalovic Coll/Coleccion T. Cekalovic 1972”(MNHN), 1 “Tierra del Fuego. Nose Peak, 14–19.1.05, R.Crawshay. 1906–230” (BMNH), 3 “S.America: Tierra del Fuego. Estancia Viamonte. P.W.Reynolds. B.M.1931–273. XII.1929” (BMNH), 1 “Magellanes, Canal Beagle, Isla Navarino/Pto. Williams, Feb.1.1957, T.Cekalovic” (USNM), 1 same as preceding except with additional label “Coccinellina sicardi (Brèthes), det Chpn 1958” (USNM), 1 “CHILE, prov. Magalle[a]nes, 20 km E. Pto Percy arenales, 10 dic 1998, leg. J.E. Barriga/Coleccion J.E. BARRIGA CHILE 111686” (USNM), 1 “Tierra del Fuego. Useless Bay, Dec. 1904, R.Crawshay, 1906–230/573 [black underline] FCC-683” (BMNH)

Etymology: From the collection locality of the specimens examined (*Patagon + ica*, adj., meaning “of Patagonia”). The name “Patagonia” was bestowed to the region by Magellan, and refers to that portion of South America which, to the east of the Andes, lies south of the Neuquén and Río Colorado rivers, and, to the west of the Andes, south of 42°S.

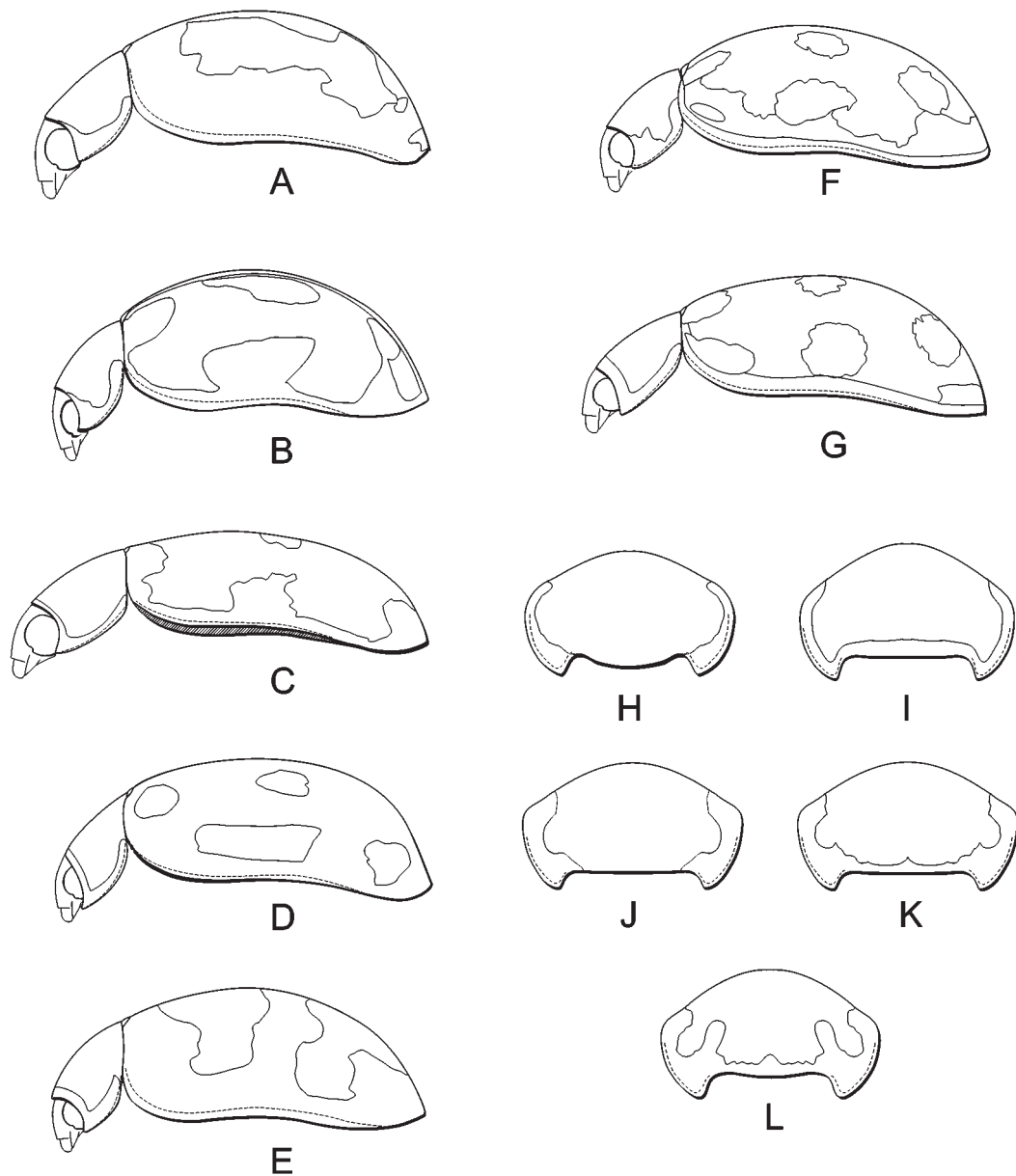


FIGURE 3. Morphology of *Cycloneda* species. Lateral views of bodies (elytral length standardized to facilitate comparison), A–G: A, *C. lacrimosa* González & Vandenberg, new species, paratype; B, *C. disconsolata* Vandenberg & González, new species, holotype; C, *C. patagonica* González & Vandenberg, new species, paratype; D, *Cycloneda germainii* (Crotch), representative specimen; E, *C. eryngii* (Mulsant), representative specimen; F, *C. sicardi* (Brèthes), specimen from Salta; G, *C. boliviana* (Mulsant), holotype. Pronotal dorsofrontal views, H–L: H, *C. lacrimosa* González & Vandenberg, new species, paratype; I, *C. boliviana* (Mulsant), holotype; J, *C. sicardi* (Brèthes), specimen from El Rincón, Catamarca; K, *C. sicardi* (Brèthes), specimen from Tacuil, Salta; L, *C. sicardi* (Brèthes), common aberration in much of range.

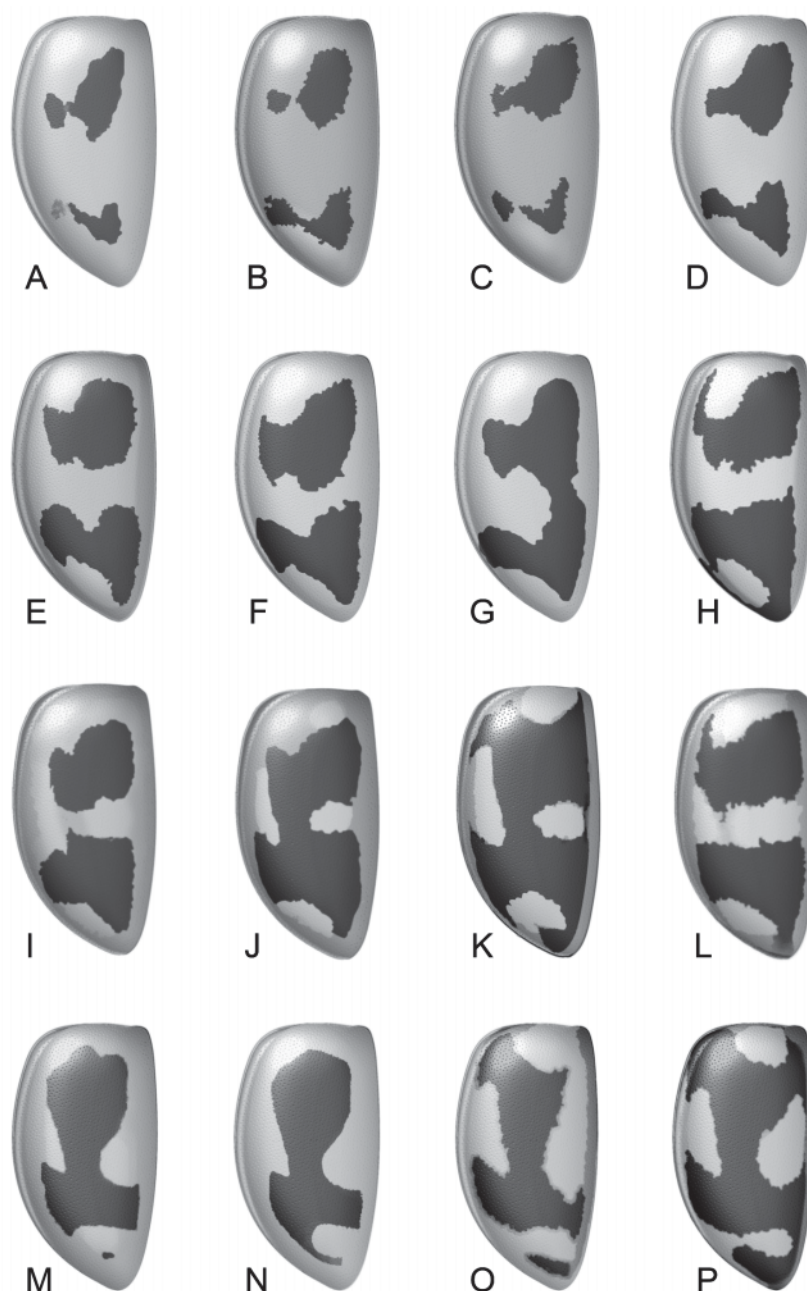


FIGURE 4. Elytral color patterns of *Cycloneda* species, left elytron: A–H, *C. eryngii* (Mulsant) (A–C, with reduced or broken maculae: A, from Rio Bueno, Valdivia; B, from San Pedro de Atacama; C, from Osorno; D–F, common aberrations; G, with confluent markings from Santiago; H, tricolored aberration from Baños de Cauquenes, Rancagua); I–L, *C. germainii* (Crotch) (I, with reduced markings from San Martín de los Andes, Neuquén; J, common aberration; K, melanic form, type of *C. duplaris* Berg; L, form with disconnected maculae, from Baños de Cauquenes, Rancagua); M–N, *C. lacrimosa* González & Vandenberg, new species, common aberrations; O–P, *C. disconsolata* Vandenberg & González, new species (O, paratype; P, holotype).

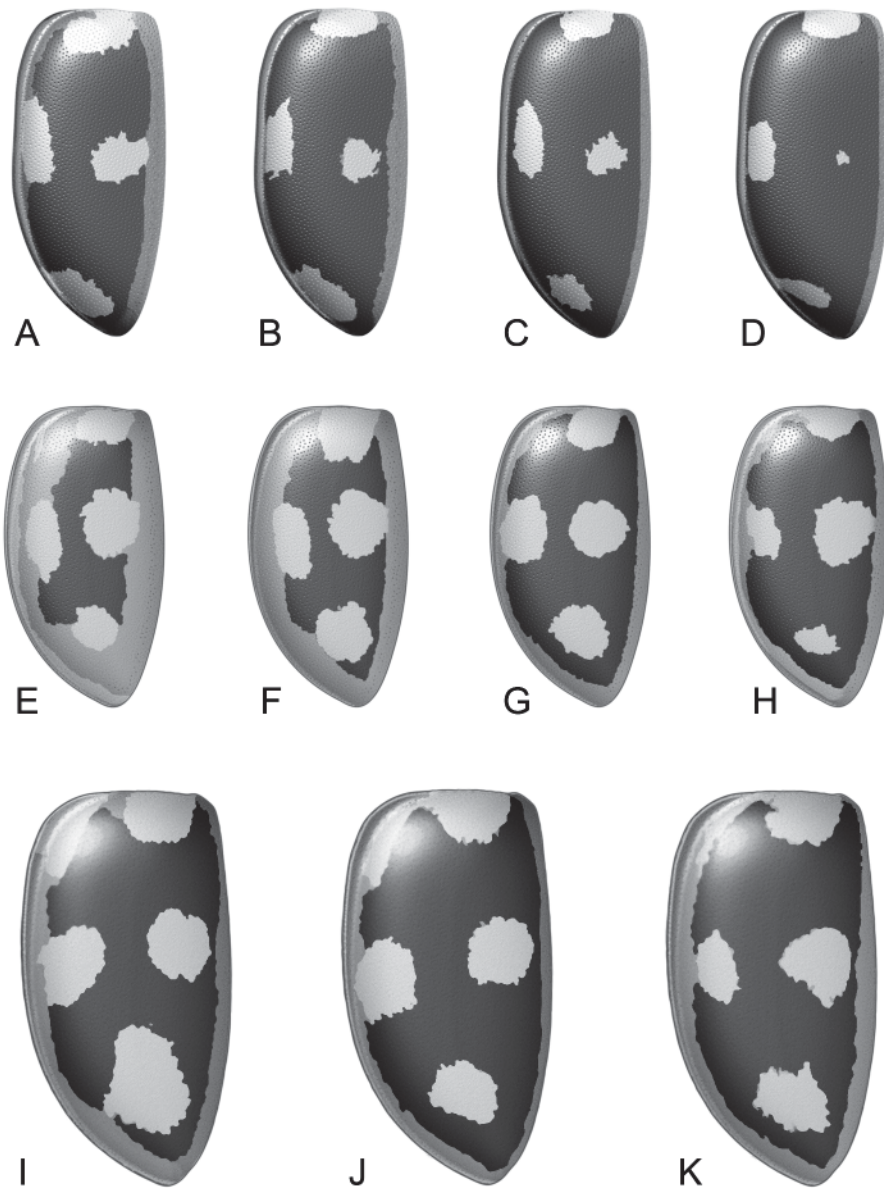


FIGURE 5. Elytral color patterns of *Cycloneda* species, left elytron: A–D, *C. patagonica* González & Vandenberg, new species, spectrum of observed variation from lightest to darkest; E–H, *C. sicardi* (Brèthes), spectrum of observed variation from lightest to darkest; I–K, *C. boliviana* (Mulsant), spectrum of observed variation from lightest to darkest.

Remarks: This new species bears the distinction of being the most austral of any coccinelline reported. It is also, thus far, the most slender and darkly pigmented species in the genus *Cycloneda*. As with *C. lacrimosa*, the color pattern on the head is not gender-specific, and resembles the female color pattern found in the related *C. germainii*.

Data from specimens examined (Map, Fig. 10): see “Type material,” above.

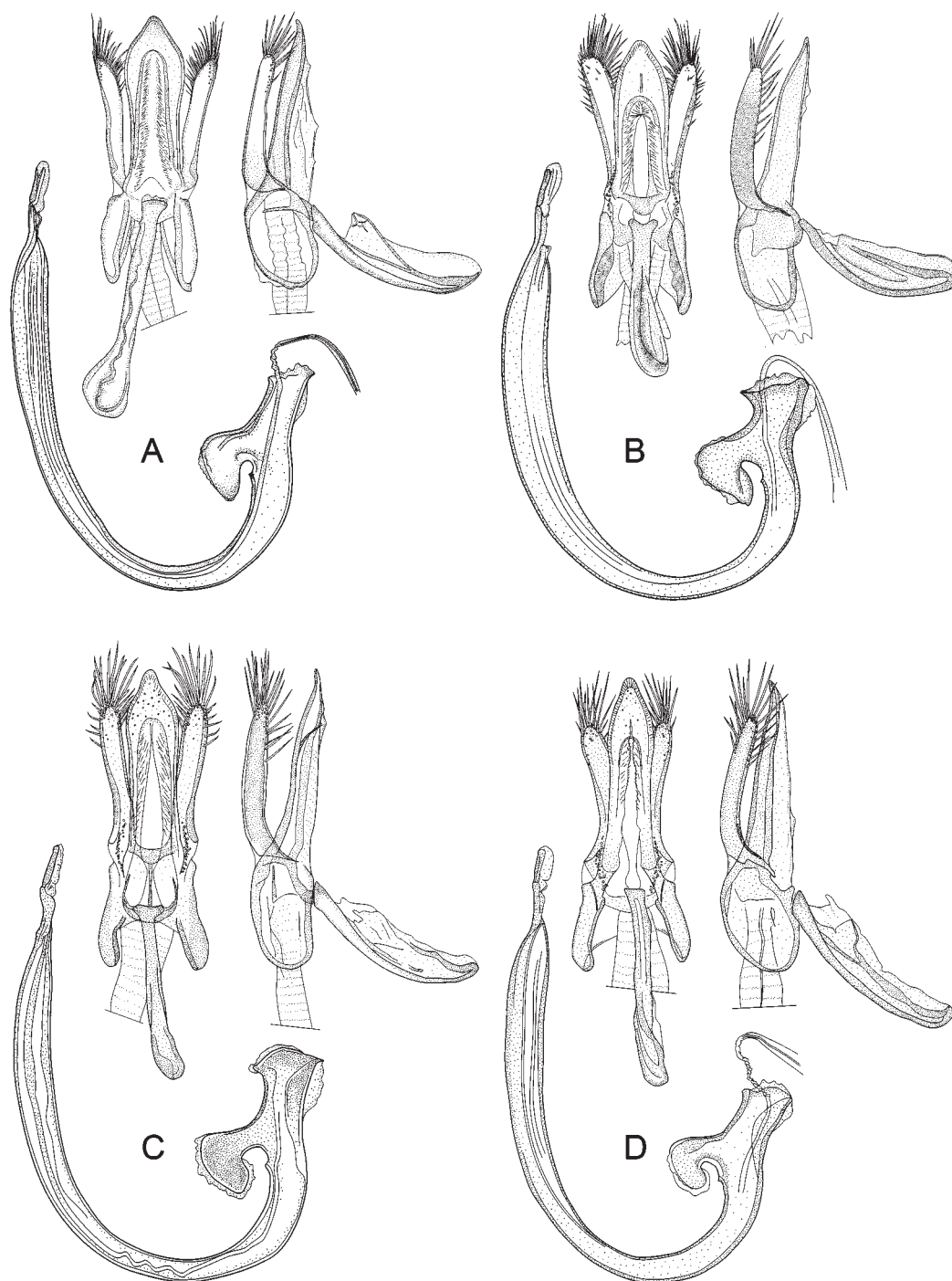


FIGURE 6. Male genitalia of *Cycloneda* species (above, ventral and right lateral views of phallobase; below, right lateral view of siphon (=aedeagus)): A, *C. lacrimosa* González & Vandenberg, new species, holotype; B, *C. patagonica* González & Vandenberg, new species, holotype; C, *C. germainii* (Crotch); D, *C. eryngii* (Mulsant).

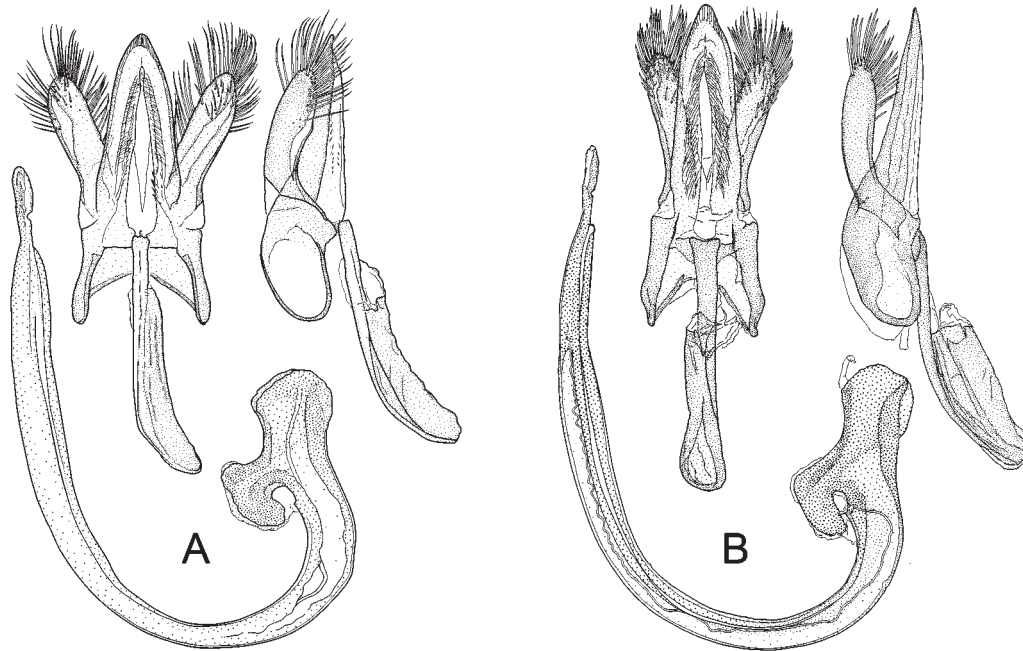


FIGURE 7. Male genitalia of *Cycloneda* species (above, ventral and right lateral views of phallobase; below, right lateral view of siph/aedeagus): A, *C. sicardi* (Brèthes), specimen from Tacuil, Salta; B, *C. boliviana* (Mulsant), specimen from Molinos, Salta.

***Cycloneda germainii* (Crotch) new combination**

(Figs. 1D; 3D; 4I–L; 6C; 8D; 9E; 10)

Coccinella germainii Crotch 1874: 106; Philippi 1887: 173.

Coccinella germaini: Weise 1906: 229 (incorrect subsequent spelling); Bosq 1952:25 (index); Brèthes 1925: 152; Korschefsky 1932: 510; Blackwelder 1945: 454.

Coccinella germaini: Bosq 1952: 13 (typo).

Coccinellina germainii: Gordon 1987: 12; Vandenberg 2002 (transfer to *Cycloneda*).

Cycloneda duplaris Berg 1899: 65; Bosq 1952: 25 (new synonym).

Coccinella duplaris Bosq 1952: 25 (index) (typo).

Coccinella areata ab. *duplaris*: Korschefsky 1932: 510; Blackwelder 1945: 454.

Arrowella albilacus Brèthes 1925: 6 (new synonym).

Coccinella sicardi Brèthes 1925: 152, in part (misidentification).

Diagnosis: Distinguished from other members of the genus by the combination of antenna composed of 10 antennomeres (Fig.9E), pronotum with an even cream-colored anterior and lateral border, and elytron with a pale subapical mark positioned relatively close to the apex (Figs. 4I–L). This species has most often been confused with *C. sicardi*, but can easily be distinguished by any one of the characters given above. Certain aberrations of *C. eryngii* are nearly indistinguishable in their elytral color pattern (e.g. Figs. 4E vs. 4I, 4H

vs. 4L), but the latter species has 11 antennomeres, the lateral margin of the elytron more arcuate in dorsal view and, in profile (Fig. 3E), with the elytron more wedge shaped, broader in basal 1/4 than in apical 1/4. These two species also can be distinguished by subtle differences in the shape of the basal lobe of the male genitalia (Fig. 6C vs. 6D), particularly in apical 1/2. *Cycloneda germainii* appears to be most closely related to *C. patagonica* but can be separated by the characters discussed in the diagnosis for the latter.

Description (Paralectotype male): Length 3.7 mm, width 2.4 mm. Form ovoid, moderately convex, feebly explanate, lateral margin weakly arcuate, appearing somewhat flattened in basal 2/3 beyond arc of humeral angle, apically tapered to blunt point; elytral, pronotal margins narrowly reflexed. Punctuation on dorsal surfaces very fine, regular, with each puncture separated by 2.5–4.0X its diameter; surface between punctures shiny, faintly reticulate on head, pronotum, with only faint trace of reticulation visible on elytron.

Dorsal color pattern as follows: Head cream-colored except for irregular blackish band at base beginning at upper 1/4 of eye, pair of small separated blackish spots nearly touching clypeal margin, with vertical row of brown stipples between each spot and base of head; eye dark with hint of silvery reflections; labrum dark brown. Pronotum predominantly black; anterior, lateral margins with even cream-colored band of little more than 1/2 diameter of eye. Scutellum black. Elytron with ground color ferrugineous yellow orange with deeply incised irregular black figure on disk configured as follows (Fig. 4J): base with broadly arcuate emargination; outer border with anteromedial wedge-shaped emargination, apical one fourth with semicircular emargination; inner border with small semielliptical emargination near midline; with semidetached dark brown spot near anterolateral edge of black figure, situated just below humeral bulge; additional narrow diffuse brown mark beginning at suture, following lateral margin less than 1/4 its distance; union of dark, light areas irregular, suffused, dark reddish brown; with 4 rounded cream-colored marks occupying medial half of basal emargination, entirely filling 3 posterior emarginations; union of dark, light areas irregular, narrowly ferrugineous, suffused. Each puncture of dorsal surfaces with pinpoint of light brown at center, visible only in areas with light to medium background coloration; double to triple staggered row of punctures at inner margin of sutural band, sparsely scattered row along lateral margin beginning just outside of humeral bulge with more pronounced pigmentation. Anterior, lateral margins of pronotum narrowly transparent to light amber, all margins of elytron dark amber.

Ground color of ventral surfaces dark brown; elytral epipleuron, pronotal hypomeron except for triangular area at inside of base light yellow orange to cream-colored; mesepimeron cream-colored; mouthparts, antenna light amber brown; apex of maxillary palps, last two antennomeres darker brown; leg dark brown, with coxa, tarsus, protibia, apex of meso, metatibiae light reddish brown. Ventral surfaces including appendages clothed in sparse decumbent silvery white pubescence; hairs fine, long.

Eyes finely faceted, separated by 2 1/4X eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 10 antennomeres (Fig. 9E), combined

length slightly greater than distance between eyes; third antennomere elongate, about $1\frac{1}{2} \times$ second, slightly shorter than third and fourth combined. Pronotum convex, lateral margin weakly reflexed at transparent border; pronotal outline with basal margin subsinuate, lateral margin strongly evenly arcuate, anterior margin subtrapezoidally emarginate, median part linear; anterior angles subtriangulate, projecting anteroventrally. Elytron somewhat elongate (Figs. 4I–L), in dorsal view with humeral angle rounded, very weakly arcuate beyond to about apical $\frac{1}{3}$, broadest near middle or just beyond, tapered to rounded apex; outer margin weakly explanate; in lateral view (Fig. 3D) unevenly arcuate, dorsally somewhat flattened in anterior $\frac{2}{3}$, more abruptly declivitous in posterior $\frac{1}{3}$, of equal breadth at anterior, posterior $\frac{1}{4}$; epipleuron approximately horizontal, very weakly ascending in anterior $\frac{1}{3}$, descending near apex, weakly concave in medial half. Prosternum T-shaped, with median third of transverse basal piece convex, gradually becoming explanate in each lateral third; intercoxal process convex with fine superficial median sulcus along most of length. Mesosternum trapezoidal; anterior border approximately linear, with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; shallowly transversely rugulose; discrimen present, distinct except for ends. Abdomen shortened semi-oval, broadest in anterior half of second ventrite; posterior margin of ventrites 1–4 linear, of 5 arcuately emarginate, 6 rounded at sides, flattened to very weakly arcuately emarginate at middle; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with rectangular basal tooth.

Male genitalia as shown (Fig. 6C): basal lobe elongate, roughly parallel-sided in basal half, subapically slightly swollen with greatest width at apical one fourth; apex tapered, slightly attenuate; parameres slender, reaching three quarters distance to apex of basal lobe.

Female: Similar to male except larger on average; head black with irregular cream-colored patch on lower half adjacent to eye, including eye canthus. Abdomen with posterior margin of ventrite 5 linear, exposed portion of ventrite 6 very short, apically rounded. Female genitalia as in figure 8D.

Variation: Length 3.3–4.3 mm. Elytral color pattern varies as shown (Figs. 4I–L).

Type material: Lectotype of *C. germainii*, designated by Gordon 1987 “type [blue label]/type chili, germ.” (UCCC, specimen examined); 3 paralectotypes of *C. germainii*, 1 “PARALECTOTYPE [circular label with blue border]/Cotype [obverse of circular label with yellow border] /Type/Chili/Germainii n.s. Crotch. [blue ink]/Fry Coll, 1905.100./PARALECTOTYPE, *Coccinella germainii* Crotch, det. R. G. Booth, 1988,” 1 with same first and last label as preceding and additional labels “372 / 372 / Chili [blue circular label]/ 64.25 [on obverse of blue circular label]/ Germainii [Crotch's handwriting in pencil]/ Named by Crotch,” 1 with same first and last label as preceding and additional labels “372/ 372/ Chili [blue circular label]/ 64.25 [on obverse of blue circular label]/ Germainii [Crotch's handwriting in pencil]/ Named by Crotch” (BMNH, specimens

examined); lectotype of *Cycloneda duplaris* Berg, here designated to promote nomenclatural stability “Typus [red print, red border]/Chub. Cordil., C. Burm. [handwritten]/II, duplaris Berg, 1899 [handwritten, green border]/FICHADO [handwritten, blue ink underlined in red],”(MBR, specimen examined); paralectotype of *Cycloneda duplaris* Berg, same locality (MBR, specimen not examined) holotype of *Arrowella albilacus* Brèthes, “type [round label]/type!/Valle del Lago Blanco Patagonia, 1903.319/Arrowella? Albilacus Brethes” (BMNH, specimen examined)

Prey species: Bosq (1952) reported “*C. Germanini*” [sic] as occurring on “pulgonos del duraznero” (=peach aphids) from Patagonia.

Remarks: *Cycloneda duplaris* (Fig. 4K) appears to be nothing more than a less common, dark morph of *C. germainii* which turns up occasionally in the more southern populations. Brèthes (1925) had two specimens of the dark morph from “Valle del Lago Blanco” Patagonia, one of which he designated as the type of *A. albilacus*, and the other he listed as an example of *Coccinella sicardi*. Charles Darwin collected a specimen in Santa Cruz, Patagonia, and additional specimens of the dark morph come from Rio San Julián, Argentina, and Puntas Arenas, Chile. Both Korschefsky (1932) and Blackwelder (1945) incorrectly placed *A. albilacus* and *C. duplaris* as aberrations of *C. areata* (treated here under the replacement name *C. sicardi*, below). Based on penned annotations in a copy of Crotch (1874) from the Smithsonian Entomology Library, Weise apparently concurred with the placement of *C. duplaris* under the species *C. germainii*. However, given the subtle differences that distinguish species in the *Cycloneda germainii* complex, our placement of *C. duplaris* in synonymy with *C. germainii* must be regarded as tentative. Some of the examples of this variety appear ever-so-slightly more elongate than the prevalent morph of *C. germainii*.

A single female specimen of *C. germainii* from Baños de Cauquenes (Fig. 4L) has a nearly identical elytral color pattern to examples of *C. eryngii* taken at the same locality (Fig. 4H). We do not believe this to be an example of *C. eryngii* with a reduction in the number of antennomeres, because the body form is that of *C. germainii* with the standard profile of that species (Fig.3D) and the elytron narrower, less arcuate basally in dorsal view. The possibility remains that this specimen represents yet another undescribed species closely allied to *C. germainii*.

Summary of data from specimens examined (Map, Fig. 10): CHILE: COQUIMBO: Las Cabras, 1500 m [m.s.n.m], 6–31.I.1963 (L. E. Pena), 1 specimen; Las Cabras, 16.I.1956 (Cekalovic), 1 specimen; LIBERTADOR: B. [Baños] de Cauquenes, Rancagua, 1 specimens. BIOBÍO: Ñuble Prov, 1650 m [m.s.n.m], Shangrila, 75 km E. Chillan, 15–16.VII.1976 (H. F. Howden), 1 specimen; Nuble, Las Trancas, 2.III. 1968 (Flint & Pena), 1 specimen; Pemehue, 1894 (Germain), 6 specimens; Laguna del Laja, Los Barros, 1900 m [m.s.n.m], 1 specimen; Cord [Cordillera] Chillan, 1899 (Germain), 3 specimens; ARAUCANIA: Tolhuaca, Curacautin, Malleco, 15,25.I. 1959 (L.E. Pena), 3 specimens; MAGALLANES: Punta Arenas, 1 specimen. **ARGENTINA:** RIO NEGRO:

7.II. 1961 (T. Cekalovic); NEUQUEN: San Martin de los Andes, 19.I.1943 (Berry), 3 specimens; Confluencia de los rios Traful y Limay, 4.II.1949 (F. Monros); Ao. Aucapan, 7 Km. S. Pilolil, 27.II. 1978 (C. M. & O. S. Flint, Jr.); CHUBUT: Epuyen [locality given as CHILE, Chubut, Epuye] 26.VIII.1962 (A. Kovacs), 2 specimens; Epuyen [locality given as CHILE, Chubut, Epuye] 12.XI.1962 (A. Kovacs), 2 specimens; Chubut Cordil. [La Cordillera de Chubut] II. 1899 (Carlos Burmeister), 1 specimen [type of *duplaris* Berg]; SANTA CRUZ: "Sta. Cruz" (C. Darwin), 1 specimen; Rio San Julián, 21.II.1980 (Fidalgo Willink, Claps Dominguez), 1 specimen; El Bolson, 3.I.1959 (A. Kovacs), 1 specimen; Valle del Lago Blanco, 2 specimens. (AMNH, BMNH, GGPC, MNHN, UCCC, USNM)

***Cycloneda eryngii* (Mulsant) new combination**

(Figs. 2A; 3E; 4A–H; 6D; 8E; 9F; 11)

Coccinella eryngii Mulsant 1850: 100, 1866: 83; Crotch 1874: 107; Philippi 1887: 173; Brèthes 1921: 454; Brèthes 1925: 152; Korschefsky 1932: 510; Blackwelder 1945: 454.

Coccinellina eryngii: Timberlake 1943: 15; Aguilera 1995: 99; Vandenberg 2002: 226 (transfer to *Cycloneda*).

Coccinellina eringii: Aguilera 1995: 99 (typo).

Coccinella interrupta Germain 1854: 334; Philippi 1887: 173; Brèthes 1921: 454 (As synonym of *C. eryngii*); Blackwelder 1945: 454.

Diagnosis: Distinguished from other members of the genus by the combination of antenna composed of 11 antennomeres (Fig. 9F) and elytron with a pair of dark transverse fasciae which lack a median longitudinal connection (Figs. 4A–F), but may be connected near their inner edges (Fig. 4G). The elytral color patterns found in this species distinguish it from all others except some uncommon examples of *C. germainii* (4I, L) that lack a median longitudinal connection between the dark elytral maculae. In such examples, the antenna with 10 antennomeres and more parallel-sided elytral base will identify these deceptively similar color morphs. In *C. eryngii*, the basal lobe of the male genitalia is more slender and apically simpler than in the other species (Fig. 6D).

Description (male from El Melocotón): Length 3.3 mm. Form ovoid, convex, feebly explanate, lateral margin evenly arcuate, apically tapered, somewhat pointed, extreme apex rounded; elytral, pronotal margins narrowly weakly reflexed. Punctuation on dorsal surfaces shallow, regular, with each puncture separated by 3.0–4.0X its diameter; surface between punctures weakly shiny, reticulate.

Dorsal color pattern as follows: Head black with cream-colored figure filling most of space between clypeal margin and middle level of eye including canthus, resembling an elongated "M" with sloping sides; two small dark triangles at clypeal margin form cut away lower border of figure. Pronotum predominantly black; anterior, lateral margins with even cream-colored band of little more than ½ diameter of eye. Scutellum black. Elytron with ground color orange yellow with pair of irregular black transverse fasciae

slightly offset from sutural, lateral margins (Fig.4D); anterior fascia occupying basal half, posterior fascia occupying apical 1/3; fasciae broader near suture, constricted in lateral third. Each puncture of dorsal surfaces with pinpoint of brown at center; double staggered row of punctures nearest suture, single to double staggered row along lateral margin beginning just outside of humeral bulge with more pronounced pigmentation. Anterior, lateral margins of pronotum narrowly transparent to light amber; all margins of elytron darker orangy amber, darkest on outer margin toward apex.

Ground color of ventral surfaces black; elytral epipleuron pale yellow orange; outer half of pronotal hypomeron, mesepimeron cream-colored; mouthparts, antenna, brownish, darkened toward apices; posterior, lateral margins of last abdominal segments dark reddish brown; leg black, with protibia, apex of meso-, metatibiae brown; all tarsi amber brown. Ventral surfaces including appendages clothed in decumbent to semi-erect pubescence of variable length, greyish white to golden in color.

Eyes finely faceted, separated by 2X eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 11 antennomeres (Fig. 9F), combined length equal to distance between eyes; third antennomere elongate, about 1¼ length of second, subequal to fourth plus fifth combined. Pronotum convex, lateral margin weakly reflexed beginning just before transparent border; base of pronotum weakly explanate beginning at middle of cream-colored border; pronotal outline with basal margin subsinuate, lateral margin strongly evenly arcuate, anterior margin subtrapezoidally emarginate, medially slightly arcuately produced; anterior angles subtriangulate, projecting anteroventrally. Elytron broad (Figs. 2A, 4A–H), in dorsal view with humeral angle rounded, evenly arcuate for rest of length, broadest near middle or just beyond, apex rounded; with outer margin weakly explanate; in lateral view (Fig. 3E) evenly arcuate dorsally, somewhat wedge shaped, broader at anterior 1/4 than at posterior 1/4; epipleuron approximately horizontal, weakly concave in medial half. Prosternum T-shaped, with lateral arms of transverse basal piece flat, folded away from midline on each side, rounded off at middle, in cross section forming a broad angle with apex blunt; intercoxal process weakly convex with narrow median sulcus along most of length. Mesosternum trapezoidal; anterior border approximately linear, with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; shallowly transversely rugulose; discrimen present, distinct except for extreme ends. Abdomen shortened semi-oval, broadest at apex of first ventrite; posterior margin of ventrites 1–4 linear, of 5 arcuately emarginate, 6 rounded at sides, arcuately emarginate in middle third; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with rectangular basal tooth.

Male genitalia as shown (Fig. 6D): basal lobe elongate, slender, roughly parallel-sided in basal half, very slightly swollen at apical one third, tapered beyond; width at base of basal lobe slightly exceeding width at apical one third; parameres slender, reaching three quarters distance to apex of basal lobe.

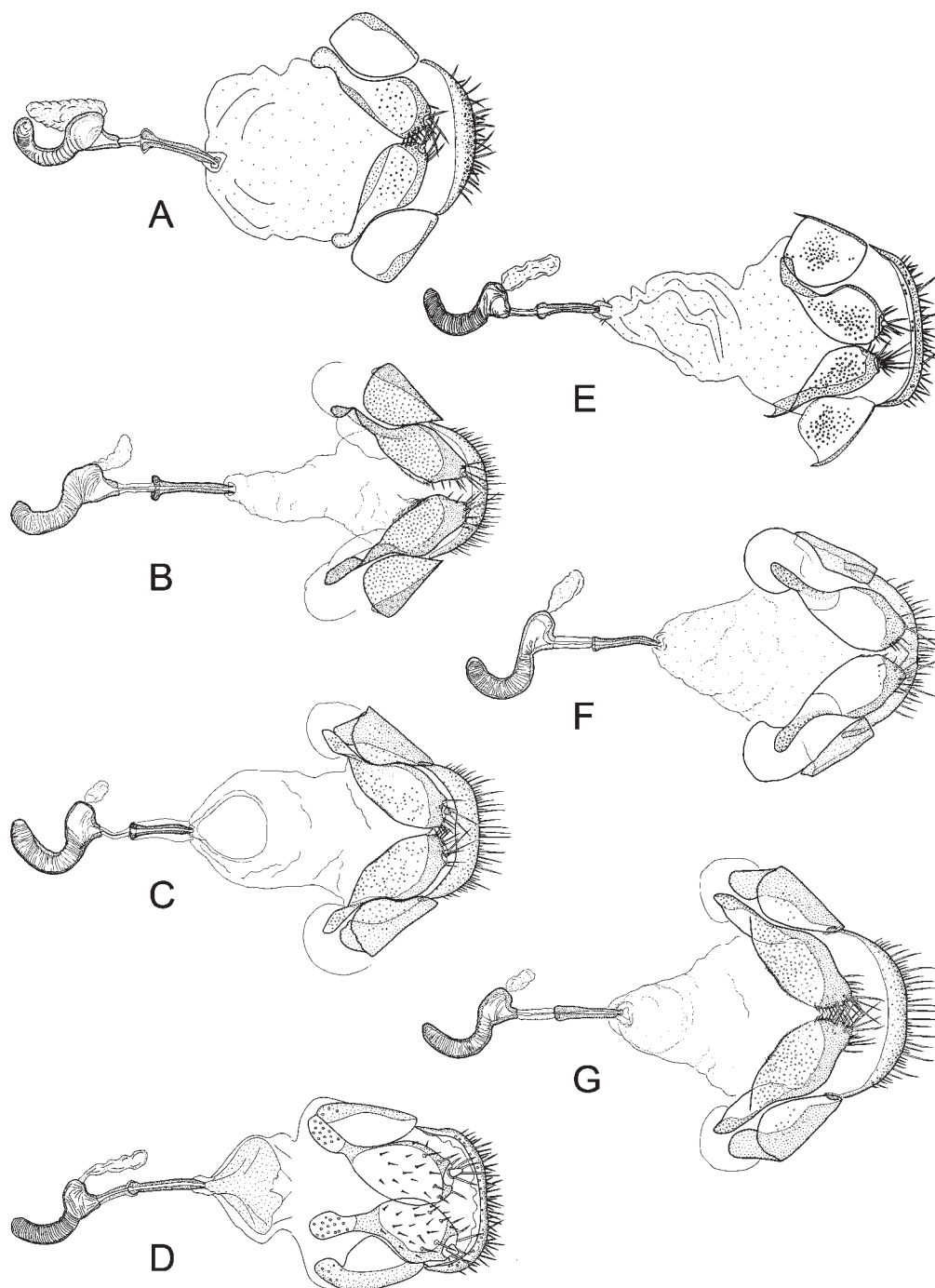


FIGURE 8. Female genitalia of *Cycloneda* species (oriented with anterior end pointing left): A, *C. lacrimosa* González & Vandenberg, new species, allotype; B, *C. disconsolata* Vandenberg & González, new species, holotype; C, *C. patagonica* González & Vandenberg, new species; D, *Cycloneda germainii* (Crotch); E, *C. eryngii* (Mulsant); F, *C. sicardi* (Brèthes), specimen from Tacuil, Salta; G, *C. boliviana* (Mulsant), specimen from Molinos, Salta.

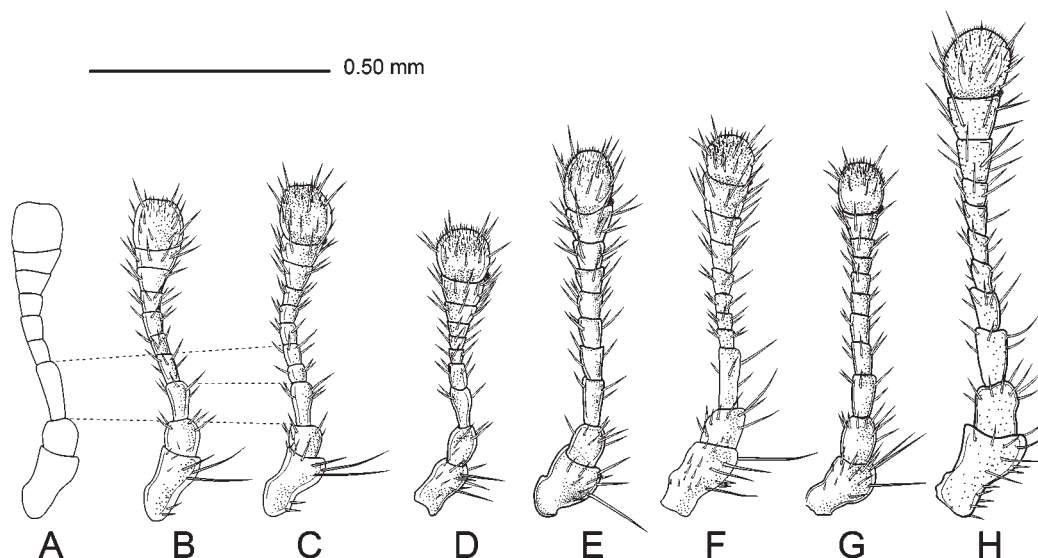


FIGURE 9. Left antenna of *Cycloneda* species, dorsal view: A–C, *C. lacrimosa* Gonzalez & Vandenberg, new species (showing variation from 9 to 11 antennomeres); D, *C. patagonica* Gonzalez & Vandenberg, new species; E, *Cycloneda germainii* (Crotch); F, *C. eryngii* (Mulsant); G, *C. sicardi* (Brèthes); H, *C. boliviana* (Mulsant).

Female: Similar to male except larger on average; head black with irregular cream-colored patch on lower half adjacent to each eye, including eye canthus. Abdomen with posterior margin of ventrite 5 linear or slightly wavy, exposed portion of ventrite 6 short, apically rounded. Female genitalia as in figure 8E.

Variation: Length 3.2–4.6 mm. Elytral color pattern varies as shown (Figs. 4A–H). Elytral ground color apparently unicolorous or gradually lightened from outer edge to disc; sometimes faintly suggesting one or more of the cream-colored markings found in *C. germainii* (e.g. oblique oval subapical mark) but less well defined; transition more abrupt in specimens from Baños de Cauquenes (Fig. 4H) which have a paler yellow cream elytron with an orange band at sutural and lateral borders. The latter morph also occurs in specimens marked “Chile” without additional locality data. Some lightly marked northern specimens possess a pair of linear cream-colored marks enclosed within the dark pronotal disc, situated one on each side at anterior 1/3, equidistant from lateral margin and midline.

Type material: Type material of *C. eryngii*, lost?, not in MHNL (location suggested in Gordon 1987); holotype of *C. interrupta*, “Prov. Valparaiso/ Holotipo No. 2159” (MNHN) (specimen examined).

Prey species: Aphididae (Hemiptera): *Metopolophium dirhodum* (Walker), *Schizaphis graminum* (Rondani), *Sitobion avenae* (F.), *Acyrtosiphon pisum* (Harris), *A. kondoi* Shinji, *Aphis gossypii* Glover, *A. craccivora* Koch, *Macrosiphum euphorbiae* (Thomas), and *Uroleucon ambrosiae* (Thomas) (data taken from Aguilera 1995).

Remarks: Brèthes placed *Coccinella interrupta* as a synonym of *C. eryngii* based on

similarities in the type descriptions, and that placement is followed here. *Coccinella chilena* (Weise) (MNHUB, type examined) and *C. limbicollis* Fairmaire (MNHP, type examined) are recognized here as distinct from *C. eryngii*. They were formerly treated as varieties of *C. eryngii* by Korschevsky (1932), and as varieties of *Coccinella interrupta* Germain by Blackwelder (1945). The unusual tricolored morph of *C. eryngii* (see figure 4H) is tentatively included here based on the antenna with 11 antennomeres, the elytron somewhat wedgeshaped in profile, with lateral margin distinctly arcuate in dorsal view, and the male genitalia with a slender basal lobe that is broadest at base (single example dissected).



FIGURE 10. Distributions of *Cycloneda* species.

Summary of data from specimens examined (Map, Fig. 11): CHILE:
ANTOFAGASTA: Chiu-Chiu, 28.IX.1986 (G. González F.), 1 specimen; Calama, Ojo Opache, 3.X.1982 (G. Arriagada), 4 specimens; Prov. [Provincia] El Loa, Calama, 31.I.1993 (G. González F.), 1 specimen; Calama, Asen. Pedro A. Cerda, en alfalfa, 13.I.1972 (R. Mendoza), 1 specimen; Rio Loa, Calama, 8.II.1987 (G. González F.), 3 specimens; San Pedro de Atacama, 2500 m [m.s.n.m], 16.XI.1946 (G. Kuschel), 1 specimen; San Pedro de Atacama, en alfalfa, 14.I.1972 (R. Mendoza), 1 specimen; San Pedro de Atacama, en alfalfa, 7.XII.1986 (G. González F.), 2 specimens; San Pedro de Atacama, en alfalfa, 29.IX.1986 (G. González F.), 2 specimens; Toconao, 18.IV.1946 (Kuschel), 1 specimen; Toconao, 17.XI.1986, 1 specimen. **ATACAMA:** El Salvador, V.1982 (G. González F.), 2 specimens; Copiapó, 19.VIII.1940 (P. A. Berry), 3 specimens; Copiapó, 25.XI.1944 (M. Marió), 2 specimens; Cachiyuyo, 19.X.1966 (R. Wagenknecht), 1 specimen; Cachiyuyo, 29.XI.1966, 1 specimen; Chañaral, 4.I.1987 (G. González F.), 3 specimens; Bahía Inglesa, 8.IV.1991, 1 specimen. **COQUIMBO:** Chapilca Huanta, km 12, 1960 m.s.n.m., en Chilla, 11.XII.1975 (A. Aguilera P.), 1 specimen; 20 miles E of La Serena, 3.XII.1950 (Ross and Michelbacher), 4 specimens; La Serena, on Baccharis, 9.XII.1950 (Ross and Michelbacher), 1 specimen; Rivadavia, Elqui, 950 m.s.n.m., 25.VIII.1973 (H. Vasquez C.), 6 specimens; 5 miles N of Laguna Dam, 8000 feet, 6.XII.1950, 1 specimen; Paihuano, II.1983, 1 specimen; 12 miles E Vicuña, 4.XII.1950 (Ross and Michelbacher), 1 specimen; Pisco Elqui, Elqui, 1300 m.s.n.m., 23.IX.1973 (H. Vasquez), 1 specimen; Panguel, 19.X.1957 (G. Kuschel), 1 specimen; 5 miles SW of Ovalle, 12.XII.1950 (Ross and Michelbacher), 1 specimen; 10 km E Fray Jorge National Park, dry wash, 28.XII.1966 (M. E. Irwin), 1 specimen; 30 km N Illapel, 5000 foot elevation, 30.XI.1950 (Ross and Michelbacher), 2 specimens; 5 miles N of Illapel, 30.XI.1950 (Ross and Michelbacher), 1 specimen; Hacienda Illapel, Rio Illapel, 600–900 m [m.s.n.m], 19.X.1966 (E. I. Schlinger, M. E. Irwin) 1 specimen; Salamanca, 15.II.79 (A. Gaete), en malezas, 1 specimen; 5 miles W of La Junta, 7.XII.1950 (Ross and Michelbacher), 4 specimens; 10 miles W of La Junta, 7.XII.1950 (Ross and Michelbacher), 6 specimens. **VALPARAISO:** Las Palmas, Ocoa, 10.XI.1956 (N. Hichins), 1 specimen; E entrance to tunnel, Aconcagua, 90 km S Illapel, 28.XI.1950 (Ross and Michelbacher), 3 specimens; [La] Ligua, IX.1997 (Germain), 1 specimen; Los Andes, Aconcagua, en Romero, 14.II.1975 (R. Ripa), 2 specimens; Los Andes, Santiago, 6.XII.1944 (gift from G. Olalquiaga F.), 4 specimens; Quillota, XI.1894 (Germain), 1 specimen; Cerro las Vizcaches_[Las Vizcachas], 1840 m [m.s.n.m], 7.XII.1951 (P. C. Hutchison), 1 specimen; Quebrada de Alvarado, 27.I.1959 (N. Hichins), 5 specimens. **METROPOLITAN REGION:** Guardia Vieja, 8.XII.2000 (M. Diéguez), 1 specimen; Farellones, Cord [Cordillera] Stgo [Santiago], 22.XI.1985, 1 specimen; Santiago, El Arrayan, 1.V.46, 3 specimens; Santiago, La Ermita, 16.XI.1985 (G. González F.), 1 specimen; Santiago, La Reina, Precordillera, 5.X.80 (G. González F.), 1 specimen; Santiago, 30.IX.1945 (P. G. Kuschel), 1 specimen; Santiago, 21.X.1945 (P. G. Kuschel), 1

specimen; Santiago, Peñalolen, III.1940 (R. Gutiérrez), 5 specimens; Santiago Prov., Que [Quebrada] La Plata 510 m [m.s.n.m], [La] Rinconada, Maipú, Malaise, 33°31'S 70°47'W, 1.I.1967 (L. A. Stange), 1 specimen; Santiago Prov., El Canelo, on path near water, 33°35'S 70°27'W, 10.I.1967 (E. I. Schlinger), 1 specimen; Stgo [Santiago], [El] Canelo, IX.1950, 1 specimen; Santiago, El Canelo, 18.X.1951 (Hofmann), 4 specimens; Santiago, El Canelo, 15.XII.1954, 8 specimens; Santiago, S[an] Bernardo, I.1940 (R. Gutiérrez), 1 specimen; Stgo [Santiago], Qbda [Quebrada] Macul, 3.IV.1913, 1 specimen; Stgo [Santiago], Cajón del Maipo, El Melocotón, I.1977 (G. González F.), 6 specimens; Stgo [Santiago], Cajón del Maipo, El Melocotón, 30.III.1986 (G. González F.), 1 specimen; Lo Valdes, 800 m [m.s.n.m], 9.I.1945 (Kuschel), 2 specimens. LIBERTADOR: Fundo Romeral, S. [San] Francisco de Mostazal, XII.1933 (Rafael Barros), 1 specimen; B. [Baños] de Cauquenes, Rancagua, 3 specimens. MAULE: Maule Prov., Rio Teno, 800 m [m.s.n.m], ca. 40 km E Curicó, 25–27.XI.1981 (D. R. Davis), 1 specimen; Curicó, Los Queñes, VIII.1944 (Monsalvez); Curicó, Los Queñes, 3.I.1988 (Sergio Roitman), 3 specimens; Maule Pr., Forel Carrizalillo, 250 m [m.s.n.m], 30.I.–5.II.1981 (L. E. Pena), 1 specimen; Talca, R.N. Altos de Lircay, 6–7.I.2001 (M. Diéguez), 3 specimens; BIO-BIO: Cord [Cordillera] Chillán, 1899 (Germain), 4 specimens; Ñuble, 15 Km E. Recinto, 31.I.1968 (C.W.O'Brien), 1 specimen; Ñuble, NW Recinto, 1.XI.1967 (C.W.O'Brien), 1 specimen; El Abanico, 30.XII.1950 (Ross and Michelbacher), 1 specimen; Abanico, 800 m [m.s.n.m], 8.I.1948 (Kuschel), 1 specimen; Los Ángeles, Huaqui, 22.I.1944 (G. Kuschel), 9 specimens; Pemehue, altitude 1300 m [m.s.n.m], 14.I.1946 (P. G. Kuschel), 1 specimen. ARAUCANÍA: Angol, 7.II.1924 (D. S. Bullock), 1 specimen; Pemehue, 1894 (Germain), 6 specimens. LOS LAGOS: Valdivia, 4.III.1945 (E. A. Chapin), 2 specimens; 8 miles E of Rio Bueno, Valdivia, 15.I.1951 (Ross and Michelbacher), 1 specimen; Osorno, 2.III.1945 (E. A. Chapin), 1 specimen; Llanquihue, Fresia, 7.II.1945, 1 specimen. (AAPC, AMNH, BMNH, GGPC, MNHN)

***Cycloneda sicardi* (Brèthes) new combination**

(Figs. 2B; 3F, J–L; 5E–H; 7A; 8F; 9G; 11)

Coccinella Sicardi Brèthes 1925: 152 (as new replacement name for *Coccinella areata* Mulsant, preoccupied by *Coccinella areata* Panzer 1794: 7); Korschevsky 1932: 510 (as synonym of *Coccinella areata* Mulsant); Blackwelder 1945: 454 (as synonym of *Coccinella areata* Mulsant).

Coccinella areata Mulsant 1850: 99, 1866: 92; Crotch 1874: 106; Weise 1910: 21 (as junior primary homonym); Korschevsky 1932: 510; Blackwelder 1945: 454; Gordon 1987: 12 (as *Coccinellina areata*).

Coccinellina areata: Timberlake 1943: 52; Gordon 1987: 12; Vandenberg 2002: 226 (transfer to *Cycloneda*).

Coccinella boliviana Weise 1910: 21 (proposed as replacement name, misidentification, not *C. boliviana* Mulsant).

Diagnosis: Distinguished from similar appearing members of the genus by the combination of antenna composed of 11 antennomeres (Fig. 9G), pronotum with uneven cream-colored to yellow anterior and lateral borders (Figs. 3J–L), and elytron with a pale subapical mark centered relatively distant from the apex. *Cycloneda sicardi* appears to be most closely related to *C. boliviana*, but differs in having the uneven pale pronotal borders, with scallops and spur like projections onto the disc, or with anterior border narrowed to obsolete. The spaces between elytral punctures are weakly shining, distinctly reticulate. This species is sometimes mistaken for *Cycloneda germainii* (see discussion under the diagnosis of that species for distinguishing characters). The short ovo-triangular basal lobe and very thick parameres of the male genitalia are distinctive.

Description (female specimen from El Rincón, Catamarca): Length 3.8 mm, width 2.8. Form oval, moderately convex, narrowly explanate, lateral margin broadly evenly arcuate, apically tapered, somewhat pointed, extreme apex rounded. Punctuation on dorsal surfaces shallow, regular, each puncture separated by 1.5–2.5X its diameter; surface between punctures weakly shiny, distinctly reticulate; punctures on head, pronotum deeper than punctures on elytron.

Dorsal color pattern as follows: Head black to dark brown with irregular cream-colored band comprising row of three contiguous spots, one at inner margin of each eye extending from eye canthus to slightly above mid level of eye, one of rounded diamond shape on frons; eye shiny silver grey; labrum very dark brown. Pronotum (Fig. 3J) predominantly blackish; lateral margins narrowly yellow cream-colored, widened apically to enclose entire anterior angle, tapered to a point opposite inner orbit of eye, continued as trace across anterior margin of pronotum. Elytron predominantly black to dark brown, with ferruginous yellow orange circumferential band, four yellow cream-colored maculae as shown (Fig. 5G): one semi-oval positioned against elytral base, narrowly separated from scutellar notch; two irregularly rounded in row near midline, outer macula vaguely subquadrate resting against yellow orange band, inner macula closer to suture than to outer macula; one in apical third between sutural, lateral margins. Yellow orange circumferential band slightly expanded near elytral apex, slightly dilated and lighter colored just outside humeral bulge. Union of dark, light areas somewhat irregular, suffused, ferruginous. Double to triple row of staggered punctures in pale circumferential band distinguished by pinpoint of brown pigmentation.

Ground color of ventral surfaces black or very dark brown; elytral epipleuron pale yellow orange; pronotal hypomeron, mesepimeron yellow cream-colored; mouthparts ochreous with last segment of maxillary palpus brown at apex; antenna ochreous with last 3 antennomeres light brown, darker near apex; posterior margins of abdominal ventrites narrowly dark reddish brown; leg black to dark reddish brown, with protibia, apex of meso-, metatibiae lighter orange brown; all tarsi amber brown except apical tarsomere dark reddish amber. Ventral surfaces including appendages clothed in fine decumbent silvery pubescence.

Eyes finely faceted, separated by $2\frac{1}{3}X$ eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 11 antennomeres (Fig. 9G), combined length greater than distance between eyes; third antennomere slightly longer than fourth. Pronotum convex at disc, with lateral $1/5$ weakly declivitous to explanate, lateral margin weakly reflexed beginning just before transparent border; pronotal outline with basal margin subsinuate, lateral margin strongly evenly arcuate, anterior margin subtrapezoidally emarginate, medially linear; anterior angles subtriangulate, projecting anteroventrally. Elytron moderately broad (Figs. 5G), in dorsal view with humeral angle narrowly arcuate, broadly evenly arcuate for rest of length, broadest at middle of length, apex rounded; outer margin of elytron weakly explanate just before transparent border, slightly very narrowly reflexed near humeral angle; epipleuron descending externally, concave in anterior half. Prosternum T-shaped, with median $1/6$ of transverse basal piece convex, somewhat protuberant, lateral arms folded back from center, slightly explanate toward lateral margin; intercoxal process convex with narrow median sulcus extending along length, traversing beyond half way point of transverse basal part. Mesosternum trapezoidal; anterior border approximately linear with weak arcuate emargination at middle, with raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; shallowly transversely rugulose; discrimen present, distinct except for extreme ends. Abdomen slightly elongate semi-oval, broadest near apex of first ventrite, base of second ventrite; posterior margin of ventrites 1–4 linear, of 5 arcuately rounded, exposed portion of 6 narrow ovotriangulate; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with rectangular basal tooth.

Female genitalia (specimen from Tacuil, Salta) as in figure 8F.

Male: Abdomen with posterior margin of ventrites 5, 6 rounded with shallow emargination in median third. Male genitalia (specimen from Tacuil, Salta) as in figure 7A: basal lobe short, stout, with greatest width at basal one fourth; tapered beyond with sides weakly arcuate; parameres thick, reaching $4/5$ distance to apex of basal lobe.

Variation: Length 3.3 to 4.1 mm. Head with pale area as described, or more or less extensive; pattern not gender specific, or only showing a slight tendency; female only rarely with pale area divided medially. Elytral color pattern and pronotal color pattern vary as shown (Figs. 2B, 5E–H; Figs. 3J–L). The specimen described above, and a few others from Catamarca appear quite similar to the holotype, particularly in the pronotal markings (Fig. 3J) and elytral coloration. The majority of specimens included under this name possess a somewhat shorter body form, and shinier elytra with a greater contrast between the color of the ferruginous elytral border and the pale elytral maculae (*e.g.* the habitus drawing of a specimen from Cafayate, Salta; fig. 2B). Variations in the size and shape of the elytral maculae are more conservative, and not concordant with differences in body size, elytral coloration, or pronotal markings. The pronotal markings of the majority of the material studied has projections from the pale anterolateral borders extending onto

the disc (Fig. 3L); in some, these are interrupted to form a pair of isolated discal spots.

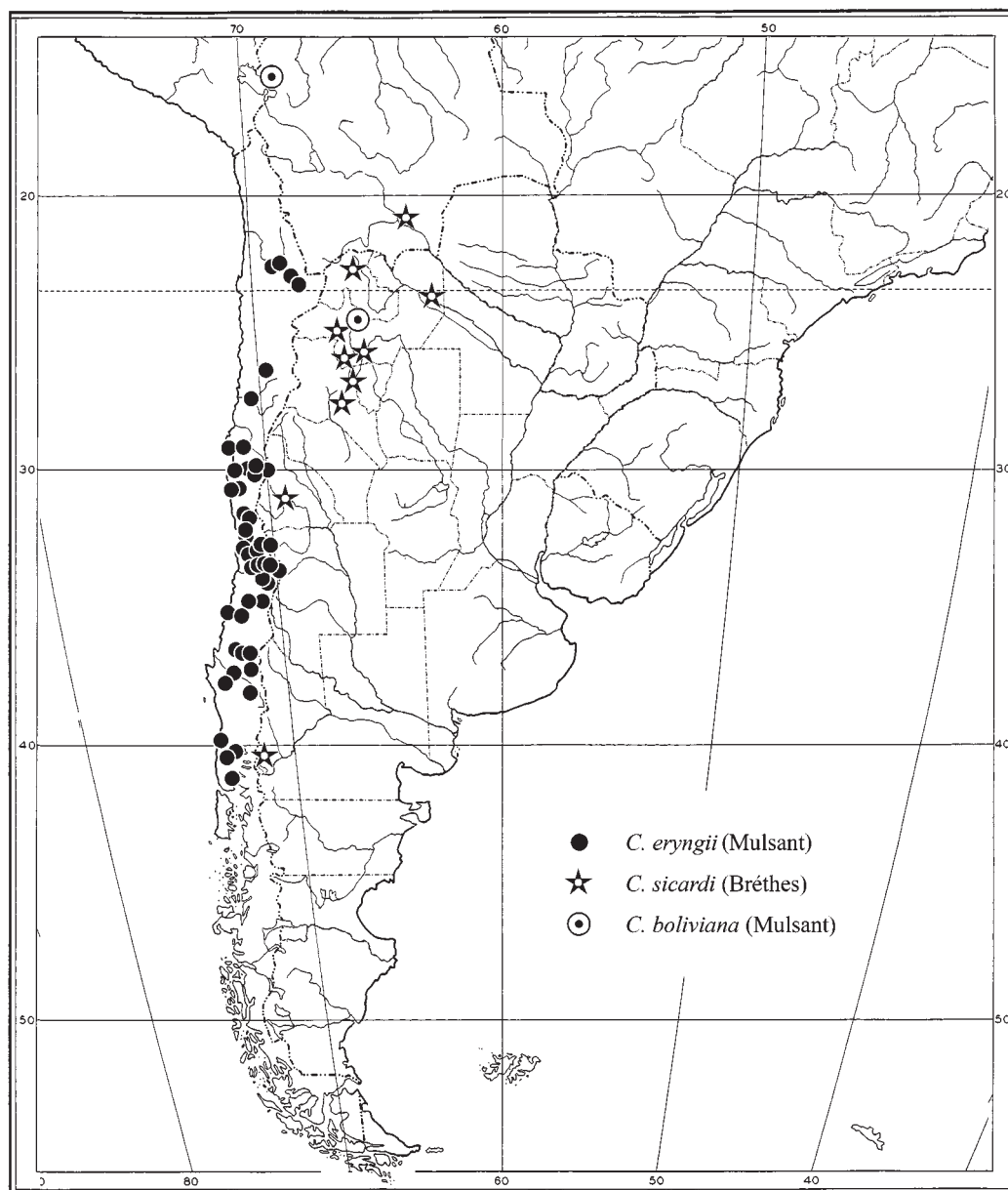


FIGURE 11. Distributions of *Cycloneda* species.

Type material: Lectotype of *C. areata* (= same as *C. sicardi*), designated by Gordon 1987 “Museum Paris, Chuquisaca, D’Orbigny/7980 34 [round label, green obverse]/2981/34 [yellow label]/museum [yellow label]/Coccinella areata Muls., auct. det./Lectotype Coccinella areata Mulsant, Gordon 1971].” (MNHP, specimen examined).

Remarks: Weise (1910) proposed *Coccinella boliviana* Mulsant as a replacement

name for *C. areata* already in use by Panzer (1794). Brèthes (1925) regarded *C. boliviana* as a “forme aberrante” of *C. areata* Mulsant, and proposed the new name *C. sicardi*. In the present work, *Cycloneda sicardi* is accepted as the valid name for this taxon, and *C. boliviana* is recognized as a distinct species, below.

The material treated here under the name *C. sicardi* is quite variable, and will likely prove to contain 1 or 2 additional undescribed species. Currently we lack males of some of the variants (including those that most closely resemble the lectotype), and the distributional data is fragmentary over much of the range. Supplementary material is needed in order to satisfactorily set species limits.

Summary of data from specimens examined (Map, Fig. 11): ARGENTINA: SALTA: Yacocochuya, Cafayate, 1950 m [m.s.n.m], 16–31.I. 1969 (Willink, Teran), 1 specimen; Cafayate, 6.III.1951 (K. J. Hayward), 3 specimen; Cafayate, II.1954 (Hayward), 1 specimen; Cachi, 22.I. 1960 (Ajmat-Bennasar) 1 specimen; Cachi, 14.II 1960 (Barrera-Paganini), 1 specimen; Rio las Conchas, 35 km Cafayate, 3.III. 1978 (A. Willink), 1 specimen; Tacil, 2,400 m [m.s.n.m], 22–27.I 1968 (R. Golbach), 1 specimen; CATAMARCA: Rincón, 8.II.1968 (A. & E. Willink), 3 specimens; Camino Andalgalá, Cafayate km 74, 2900 m [m.s.n.m] (A. Willink), 2 specimens; SAN JUAN: San Juan de Cuyo, 1892 (J. Fortucci), 6 specimens; TUCUMAN: Zapallar, 16.I.1943 (Berry), 1 specimen; NEUQUEN: San Martin de los Andes, 19.I.1943 (Berry), 1 specimen. **BOLIVIA:** CHUQUISACA, 1 specimen. (IML, MNHP, USNM)

***Cycloneda boliviana* (Mulsant) new combination, status revised**
(Figs. 2C; 3G; I; 5I–K; 7B; 8G; 9H; 11)

Coccinella boliviana Mulsant 1866: 75; Crotch 1874: 106 (as synonym of *C. areata* Mulsant); Weise 1910: 21 (as synonym of *C. areata* Mulsant); Gordon 1987: 12 (as synonym of *C. areata* Mulsant).

Coccinella areata ab. *boliviana* Korschefsky 1932: 510; Blackwelder 1945: 454.

Diagnosis: Distinguished from similar appearing members of the genus by the combination of antenna composed of 11 antennomeres (Fig. 9H), pronotum with an even cream-colored or yellow anterior and lateral border (Fig. 3I), and elytron with a pale subapical mark centered relatively distant from the apex (Fig. 5I–K). This species is the largest in the *C. germainii* species complex, and has a distinctly matt or pruinose appearance to the elytra. It is most closely related to *C. sicardi* (see diagnosis above), but has even cream-colored pronotal borders. The male genitalia of this species are distinctive (Fig. 7B).

Description (Holotype female) (Fig. 2C): Length: 4.6 mm, width 3.3 mm. Form ovoid, weakly convex, narrowly explanate, lateral margin broadly weakly arcuate, apically

tapered, somewhat pointed, extreme apex rounded. Punctuation on dorsal surfaces shallow, regular, each puncture separated by 1.5–2.5X its diameter; surface between punctures matt, strongly reticulate; punctures on head, pronotum easily discernable; punctures on elytra more shallow, nearly obsolete, more noticeable along lateral margins.

Dorsal color pattern as follows (Fig. 2C): Head black with two cream-colored spots, one at inner margin of each eye extending from eye canthus to mid level of eye; eye dark with hint of silvery reflections; labrum very dark brown. Pronotum predominantly black; anterior, lateral margins with narrow even cream-colored border (Fig. 3I), slightly wider in lateral than anterior margin. Elytron predominantly black, with narrow light tan to ferrugineous band along anterior, lateral borders; band abruptly angularly expanded near elytral apex (Fig. 3G); sutural border much narrower, very dark reddish brown. 5 cream-colored irregularly rounded maculae disposed as follows: one resting on elytral base narrowly separated from scutellar notch; two in row near midline, outer macula just touching ferrugineous lateral band, inner macula closer to suture than to outer macula; one in apical third between sutural, lateral margins. Additional small comma-shaped cream-colored mark, resting on ferrugineous band, positioned between humeral bulge, lateral margin. Outer margins of all cream-colored maculae narrowly ferrugineous. Punctures in pale areas of elytron sometimes distinguished by pinpoint of brown pigmentation particularly noticeable along lateral edge of outer maculae, inner edge of lateral ferrugineous band. Blackish areas on dorsal surfaces appear pruinose, reflecting bluish tint when brightly illuminated.

Ground color of ventral surfaces black or very dark brown; elytral epipleuron ocher; lateral ½ of pronotal hypomeron, mesepimeron cream-colored; mouthparts, antenna, tarsi dark reddish brown. Ventral surfaces including appendages clothed in fine decumbent silvery pubescence.

Eyes finely faceted, separated by 2X eye diameter; inner orbits nearly parallel in lower half, diverging at upper level. Antenna of 11 antennomeres (Fig. 9H), combined length distinctly greater than distance between eyes; third antennomere slightly longer than fourth. Pronotum weakly convex, lateral margin explanate beginning just before transparent border. Pronotal outline with basal margin subsinuate; lateral margin strongly arcuate in basal half, weakly arcuate beyond; anterior margin subtrapezoidally emarginate; medially linear; anterior angles subtriangulate, projecting anteroventrally. Elytron elongate (Figs. 5I–K), in dorsal view with humeral angle rounded, evenly weakly arcuate for rest of length, broadest at apical 2/5, apex rounded, outer margin weakly explanate; epipleuron weakly concave, descending externally. Prosternum T-shaped, with lateral arms of transverse basal piece flat, weakly folded away from midline on each side, weakly convex at middle; intercoxal process nearly flat with median third weakly impressed. Mesosternum trapezoidal; anterior border nearly linear, indistinctly emarginate at middle, with faint raised margin. Metasternum broad, with postmesocoxal line reaching lateral margin; transversely rugulopunctate; discrimen present, distinct except for extreme ends.

Abdomen shortened semi-oval, broadest at second ventrite; posterior margin of ventrites 1–4 linear, of 5 approximately linear but slightly wavy, weakly protuberant at middle, 6 rounded; postmetacoxal line of first abdominal ventrite curved posterolaterad, closely paralleling posterior margin for much of length, not attaining lateral margin. Tarsal claw with rectangular basal tooth.

Female genitalia (specimen from Molinos, Salta) as in figure 8G.

Male: Similar to female except head black with cream-colored band filling most of space between clypeal margin and level of upper 1/3 of eye including canthus; border separating black and cream-colored areas wavy; area near clypeus slightly infusate. Abdomen with posterior margin of ventrite 5 linear, exposed portion of ventrite 6 rounded with shallow emargination in median third. Male genitalia as in figure 7B: basal lobe elongate, with greatest width at basal one fourth; tapered beyond with sides slightly sinuate; parameres slightly thick, reaching 4/5 distance to apex of basal lobe.

Variation: Length 4.2–4.6 mm. Elytral color pattern varies primarily in the width of the tan to ferrugineous band and size of the cream-colored maculae as shown (Figs. 5I–K). Elytral ground color varies from deep maroon brown to black.

Type material: Lectotype of *C. boliviana*, designated Gordon 1987, “TYPE [blue paper]/TYPE, boliviana, Deyr.” (UCCC, specimen examined).

Remarks: Mulsant (1866) regarded this as a good species, but subsequent authors, until the present, treated it as a synonym or mere aberration of *C. areata* (= *sicardi*).

Summary of data from specimens examined (Map, Fig. 11): ARGENTINA: SALTA: Molinos, 21.I. 1950 (Monros-Willink), 2 specimens; **BOLIVIA:** LA PAZ: Sorata, 21.II. 1953 (F. Monros), 1 specimen; Sorata, II 1941 (W. Wittmer), 2 specimens (BMNH, IML, UCCC)

Acknowledgments

We gratefully acknowledge the following individuals and their associated institutions for access to and/or loan of specimens in their care: Lee Herman (AMNH), Max Barclay and Roger Booth (BMNH), David Kavanaugh (CASC), Arturo Teran (IML), Alfonso Aguilera (AAPC, INIA), Joël Clary (MHNL), Mario Elgueta (MNHN), Nicole Berti (MNHP), Manfred Uhlig (MNHUB), Axel Bachmann (MBR), and William Foster (UCCC). For assistance in locating and obtaining specimens on loan, we thank Leopoldo Caltagirone (U.C. Berkeley, Department of Entomology, California). For assistance in locating key reference material, we thank Roger Booth, John Brown (SEL), and Daria Wingreen-Mason (Smithsonian Cullman Library, Washington, D.C.). For review of the manuscript and many helpful comments, we thank J. Poorani (Project Directorate of Biological Control, Bangalore, India), Roger Booth, Dave Nickle (SEL), and Allen Norrbom (SEL). We are particularly grateful for the artistic advice and contributions provided by two members of the USDA, Systematic Entomology Laboratory (USNM): Marie Metz made

line drawings of the antennae and lady beetle profiles in figure 9C–H and 3A–G. Elisabeth Roberts drew the male genitalia in figure 7, and the female genitalia in figure 8B, F–G and assisted extensively in the proofing and correcting of the morphological drawings and plate layouts, as well as the specimen data summaries—meticulous and time consuming tasks. Elisabeth Roberts and Cathy Apgar assisted in the location of data points for the distributional maps.

Literature cited

- Aguilera A. (1995) Contribución al conocimiento de *Coccinellina eryngii* (Mulsant) (Coleoptera: Coccinellidae) en Chile. *Acta Entomológica Chilena*, 19, 99–104.
- Blackwelder, R.E. (1945) Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. Part 3. *Bulletin of the United States National Museum*, 185, 343–550.
- Bosq, J.M. (1952) Enumeración de predadores observados en la República Argentina (Coleópteros y Hemípteros). *Ministerio de Agricultura y Ganadería*, Serie A, No 54, 5–29.
- Brèthes, J. (1925) Sur une collection de Coccinellidae (et un Phalacridae) du British Muséum. *Anales del Museo Nacional de Historia Natural*, 33, 145–175.
- Chapin, E.A. (1940) New genera and species of lady-beetles related to *Serangium* Blackburn (Coleoptera: Coccinellidae). *Journal of the Washington Academy of Sciences*, 30, 263–272.
- Crotch, G.R. (1874) *A revision of the coleopterous family Coccinellidae*. University Press, London, 311 pp.
- Erichson, W.F. (1842) Beitrag zur Insecten-Fauna von Vandiemensland, mit besonderer Berücksichtigung der geographischen Verbreitung der Insecten, von Herausgeber. *Archiv für Naturgeschichte*, 8, 238–241.
- Gordon, R.D. (1985) The Coccinellidae (Coleoptera) of America north of Mexico. *Journal of the New York Entomological Society*, 93, 1–912.
- Gordon, R.D. (1987) A catalogue of the Crotch collection of Coccinellidae (Coleoptera). *Occasional Papers on Systematic Entomology*, 3, 1–46.
- Korschefsky, R. (1932) *Coleopterorum Catalogus, Pars 120, Coccinellidae II*. W. Junk, Berlin, 659 pp.
- Miyatake, M. (1961) The East-Asian coccinellid-beetles preserved in the California Academy of Sciences, tribe Serangiini. *Memoirs of the Ehime University*, Sect. VI (Agriculture), 6(2), 135–146.
- Mulsant, E. (1850) Species des coléoptères trimères securipalpes. *Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie*, Lyon, ser.2, vol 2, 1–1104.
- Panzer, G.W.F. (1794) *Faunae insectorum Germanicae initia oder Deutschlands Insecten, gesammelt und herausgegeben von Georg Wolfgang Franz Panzer*. Nürnberg, Felseckerschen Buchhandlung, vol. 24.
- Timberlake, P.H. (1943) The Coccinellidae or ladybeetles of the Koebele collection. *The Hawaiian Planters' Record*, 47(1), 1–67.
- Vandenberg, N.J. (1992) Revision of the new world lady beetles of the genus *Olla* and description of a new allied genus (Coleoptera: Coccinellidae). *Annals of the Entomological Society of America*, 85(4), 370–386.
- Vandenberg, N.J. (2002) The new world genus *Cycloneda* Crotch (Coleoptera: Coccinellidae: Coccinellini): Historical review, new diagnosis, new generic and specific synonyms, and an improved key to North American species. *Proceedings of the Entomological Society of Wash-*

- ington, 104(1), 221–236.
- Vandenberg, N. & Gordon, R.D (1988) The Coccinellidae (Coleoptera) of South America, part I. A revision of the genus *Erythroneda* Timberlake, 1943. *Revista Brasileira de Entomologia*, 32, 31–43.
- Vandenberg, N.J. & Gordon, R.D (1996) A new genus of Neotropical Coccinellini (Coleoptera: Coccinellidae) related to *Olla* Casey and allies. *Proceedings of the Entomological Society of Washington*, 98(3), 541–550.
- Weise, J. (1910) Chrysomeliden und Coccinelliden, Sonderabdruck aus dem XLVIII. Bande der *Verhandlungen des naturforschenden Vereins zu Brünn*, 20–29.